



# EG2420 Monte Carlo Simulation Theory and Project 7.5 credits

Teori och projekt i Monte Carlo-simulering

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

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

## Establishment

Course syllabus for EG2420 valid from Spring 2019

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

Second cycle

## Main field of study

Electrical Engineering

## Language of instruction

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

## Intended learning outcomes

To pass the course, the students should show that they are able to

- apply method for random number generation, simple sampling and variance reduction techniques,
- formulate models appropriate for Monte Carlo simulation and design suitable simulation methods,
- analyse suggested simulation methods and provide constructive criticism.

## Course contents

Theory and examples are presented during the lectures and are then applied by the students in a number of home assignments, which are to be solved using appropriate software (for example Matlab). The course will include the following topics:

- general probability theory
- random variables
- random number generation
- simple sampling
- complementary random numbers
- dagger sampling
- control variates
- correlated sampling
- stratified sampling
- importance sampling

## Disposition

Lessons, seminars, project assignment

## Specific prerequisites

- SF1625 Calculus in one variable (or equivalent)
- SF1626 Calculus in several variables (or equivalent)
- MJ1520 Statistics and risk assessment or SF1901 Probability theory and statistics (or equivalent)
- English B/English 6 (or equivalent)

## Course literature

M. Amelin, Monte Carlo Methods in Engineering, course compendium

## Examination

- PRO1 - Project Work 1, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 3.5 credits, grading scale: P, F

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.

The final grade is equal to the grade of the project assignment.

## Other requirements for final grade

Each part of the examination must be passed.

## 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.