SF2822 Applied Nonlinear Optimization 7.5 credits

Tillämpad ickelinjär optimering

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

Establishment

The course syllabus is valid from Spring 2022 according to the school principal's decision: S-2022-0529 Decision date: 2022-02-24

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

• English B / English 6
• Completed basic coursein optimization (SF1811, SF1861 or equivalent)
• Completed basic course in mathematical statistics (SF1914, SF1918, SF1922 or equivalent)
• Completed basic course in numerical analysis (SF1544, SF1545 or equivalent)
• Completed basic course in differential equations (SF1633, SF1683 or equivalent).

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 student should be able to do the following:

- Apply theory, concepts and methods from the parts of optimization that are given by the course contents to solve problems.
- Model, formulate and analyze simplified practical problems as optimization problems and solve by making useof given software.
- Collaborate with other students and demonstrate ability to present orally and in writing.

To receive the highest grade, the student should in addition be able to do the following:

- Combine and explain the methods in the course, and
- Apply and explain the theory and the concepts of the course in the practical problems that are included.

Course contents

- Unconstrained optimization: optimality conditions: Newton methods, quasi-Newton methods, conjugate gradient methods.
- Constrained optimization: optimality conditions, quadratic programming, sequential quadratic programming, barrier methods, primal-dual interior methods.
- Semidefinite programming including interior methods.
- Convexity and convex relaxations.

Examination

- PRO2 - Project, 1.5 credits, grading scale: A, B, C, D, E, FX, F
- PRO1 - Project, 1.5 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, 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.

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

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.