SF2822 Applied Nonlinear Optimization 7.5 credits

Tillämpad ickelinjär optimering

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

Establishment

Course syllabus for SF2822 valid from Spring 2011

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

In general:

150 university credits (hp) including 28 hp in Mathematics, 6 hp in Mathematical Statistics and 6 hp in Optimization. Documented proficiency in English corresponding to English B.

More precisely for KTH students:

Passed courses in calculus, linear algebra, differential equations, mathematical statistics, numerical analysis, optimization. A passed second course in numerical analysis is an advantage.

Language of instruction

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

Intended learning outcomes

To deepen and broaden the student's theoretical and methodological knowledge in nonlinear programming.

To give training in the art of modeling and solving practical problems, and in presenting the results.

Course contents

Theory and methods:

Newton methods, Quasi-Newton methods, and conjugate-gradient methods for unconstrained optimization. Optimality conditions, quadratic programming, SQP methods, and primal-dual interior methods for nonlinearly constrained optimization. Semidefinite programming and interior methods. Convexity and convex relaxations.

Projects:

This part of the course consists of modeling practical optimization problems and using available optimization software to solve them. The projects are carried out in small groups. An important aspect of the course is cooperation within the group as well as presentations in talking and in writing.

Course literature

To be announced at the beginning of the course. Preliminary literature:

Linear and Nonlinear Programming by S.G.Nash och A.Sofer, McGraw-Hill, and some material from the department.

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.

Other requirements for final grade

A written exam (TEN1; 4,5 hp).
Projects (PRO1; 3 hp).

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.