



DD2446 Complexity Theory 6.0 credits

Komplexitetsteori

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 DD2446 valid from Autumn 2009

Grading scale

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

Education cycle

Second cycle

Main field of study

Computer Science and Engineering, Information Technology, Information and Communication Technology

Specific prerequisites

Language of instruction

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

Intended learning outcomes

After a completed course, the student should be able to

- define basic complexity classes such as P, NP, PSPACE, L, NL and NC,
- formulate complete problems for each complexity class and show problems complete by reductions,
- prove basic theorems about complexity measures and be able to reason about complexity theoretic concepts,
- read research articles within complexity theory to the extent of understanding the main contribution of the paper.

Course contents

The fundamental goal of complexity theory is to classify problems according to the amount of resources needed to solve them. Complexity classes are classes of problems that in some respect demand the “same” amount of resources. The most basic resources studied are time and space. A complete problem for a complexity class is a problem that can be viewed as the hardest problem in the class.

Among the topics treated in the course are: Complexity classes: L, NL, P, NP, PSPACE, etc, Reductions and completeness, Cooks' theorem. Approximability, Randomized algorithms and Interactive proofs (IP).

Course literature

To be announced at least 4 weeks before course start at course web page. 07/08: S. Arora and B. Barak Computational Complexity: A Modern Approach, Cambridge University Press.

Examination

- ÖVN1 - Hand in Task, 6.0 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.

In this course all the regulations of the code of honor at the School of Computer science and Communication apply, see: http://www.kth.se/csc/student/heder-skodex/1.17237?l=en_UK.

Other requirements for final grade

Written exercises (ÖVN1; 6 university credits).

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.