



# **FDD3003 Parallel Computing: Theory - Hardware - Software with Special Focus on Mul- ti-Core Programming 7.5 cred- its**

Parallella beräkningar: teori - maskinvara - programvara, med särskilt fokus på flerkärnig programmering

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

## **Establishment**

Course syllabus for FDD3003 valid from Spring 2019

## **Grading scale**

P, F

## **Education cycle**

Third cycle

## **Specific prerequisites**

## **Language of instruction**

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

## Intended learning outcomes

The overall goal of the course is to give basic knowledge of the theory, hardware, and software approaches to parallel computing. Especially, hardware and software challenges and the interactions between them, as well as exposure to research challenges in this field will be emphasized.

After the course you will be able to:

- understand the properties of different parallel architectures
- reason about the performance of a system
- assess the potential and limitations of parallel processing
- chose between different parallelization techniques
- write parallel programs on multi-core machines.

## Course contents

- Introduction to Parallelism
- Performance Considerations
- Parallel Architectures • Shared Memory • Scalable Multi-Processors • Interconnection networks
- Parallel Programming Methods and Techniques • Task and Data parallelism • Programming for performance • Overview of programming techniques
- Multi-Core programming • Properties of Multi-Core architectures • Pthreads • OpenMP
- Future Directions • GPU, Accelerators

## Examination

- EXA1 - Examination, 7.5 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.

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

## Other requirements for final grade

Homework assignments for the first part of the program. Programming assignments and project work for the second half of the program.

## **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.