FIS3200 Parallel Computer Systems 10.0 credits

Parallella datorsystem

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 FIS3200 valid from Autumn 2010

Grading scale

Education cycle

Third cycle

Specific prerequisites

Accepted to doctoral studies in computer, software, communication or electronic systems, or similar.

Language of instruction

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

Intended learning outcomes

The goals of this course is that the student should:

- understand and be competent in formulating problems for parallel programming,
- have knowledge about the principles of the design of modern parallel computer systems, and
- understand how the performance of a parallel computer is affected by:
  - the particular system architecture,
  - the partitioning of an application and the programming model

In addition, the student should be able to plan and carry out a smaller research project.

Course contents

- Hardware: Architecture of bus-based symmetric multiprocessors (SMPs) and scalable distributed memory multiprocessors (NUMA): cache coherency, memory consistency, synchronization and bus and interconnection network design.
- Software: Models of parallel computation and parallel programming environments, in particular OpenMP (shared memory) and MPI (Message Passing). Parallel algorithms and problem decomposition techniques.
- Performance: performance aspects of parallel programs, the program's interaction with the architecture and performance models (analytic and simulation models).
- Practical part: hand-in assignment which can be parallel programming on a real parallel computer, an architecture study or a combination.

Course literature

Will be announced on the course web page one month before course start.

Equipment

Access to PC (x86 Linux) computer with KTH IP-number.

Own lap-top preferred.

Examination

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.

All written reports will be checked for plagiarism.

Other requirements for final grade

- PRO1 - Project, 6 cr, grade scale: P/F
- TEN1 - Examination, 4 cr, grade scale: P/F

Examination will take place in conjunction with a master level course IS2200 Parallel computer systems. A level of grade C on these examinations are required for a passing grade on this course.

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.