



DEPARTMENT OF MATHEMATICAL SCIENCES

MMA620 High Performance Computing, 7.5 credits

Högprestandaberäkning, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Mathematical Sciences on 2017-06-22 and was last revised on 2019-05-15 to be valid from 2019-09-02, autumn semester of 2019.

Field of education: Science 100%

Department: Department of Mathematical Sciences

Position in the educational system

The course can be part of the following programmes: 1) Mathematical Sciences, Master's Programme (N2MAT), 2) Applied Data Science Master's Programme (N2ADS) and 3) Bachelor's Programme in Mathematics (N1MAT)

Main field of studies

Mathematics

Specialization

A1N, Second cycle, has only first-cycle course/s as entry requirements

Entry requirements

The prerequisite for the course High Performance Computing is the equivalent of 90 credits, including the courses MMG300 Multivariable Analysis, MMG410 Numerical Analysis, and some basic course in programming.

Learning outcomes

After completing the course the student will be able to

- organize programming work on a remote computer using Linux command line tools
- write simple parallel programs using MPI, OpenMP, or OpenCL
- describe the basic features of CPUs, GPUs, FPGAs, and hardware accelerators

- assess the influence of hardware and software on runtime performance.

Course content

- Short introduction to C and Python to the extent that is necessary for the computer labs.
- Linux command line tools.
- Parallel programming using threads, OpenMP, MPI, and OpenCL.
- Hardware architecture.
- Code optimization and compiler flags.
- Overview of libraries in numerical analysis.

Form of teaching

Language of instruction: English

Assessment

The examination consists of computer based assignments, a short presentation and a take-home exam.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

Course evaluation

Oral and/or written course evaluation will be performed. The results of the evaluation will be communicated to the students and will serve as a guide for the development of the course.

Additional information

The syllabus for MMA620 was originally established to take effect from 2007-07-01, and was revised 2011-07-01.