



# DD2443 Parallel and Distributed Computing 7.5 credits

Parallella och distribuerade beräkningar

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

## Establishment

Course syllabus for DD2443 valid from Spring 2019

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Computer Science and Engineering

## Specific prerequisites

Single course students:

SF1604 Linear algebra, SF1625 Calculus in one variable, SF1901 Probability theory and statistics, SF1630 Discrete mathematics, DD1337 Programming, DD1338 Algorithms and Data Structures, DD1352 Algorithms, Data Structures and Complexity or corresponding courses

## Language of instruction

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

## Intended learning outcomes

On completion of the course, the student should be able to:

- understand and account for models, limitations and fundamental concepts within parallel computations with communication based both on message passing and shared memory. apply this understanding to. the analysis of concrete systems and algorithms.
- adapt and develop algorithms for execution on parallel and distributed machines and analyse the algorithms for correctness, reliability, safety and performance.

## Course contents

The course is an advanced course in parallel and distributed computations, dealing with the following subjects:

- models, fundamental concepts and analytical methods for parallel and distributed systems, fundamental limitations and impossibility results,
- algorithms and protocol for commonly occurring computational problems within communication, synchronisation, fault tolerance, coordination and consensus, replication and sharing, security, and peer-to-peer systems,
- basic knowledge of synchronization mechanisms within operating systems and programming languages (semaphores, locks, monitors) and some interest for theoretical subjects are good starting points.

## Course literature

M. Herlihy, N. Shavit: The art of multiprocessor programming, revised reprint 2012.

## Examination

- TEN1 - Examination, 7.5 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

- TEN1 - Exam, 7.5 hp, grading scale: A, B, C, D, E, FX, F

## **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.