FID3021 Advanced Course in Distributed Algorithms 7.5 credits

Avancerad kurs i distribuerade algoritmer

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 FID3021 valid from Autumn 2017

Grading scale

Education cycle

Third cycle

Specific prerequisites

Enrolled as a doctoral student.

Language of instruction

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

Intended learning outcomes

After the course the student will be able to discuss, analyze, present, and critically review the very latest research advancements in the area of reliable distributed algorithms and associate theory, and make connections to knowledge in related fields. The student will also be able to assess and evaluate new emerging trends as well as to identify the need for further knowledge in the field.

Course contents

This course is a foundational course on the theory and algorithms of reliable distributed systems. The course covers the following topics.
* Formal modeling of distributed systems using input/output automata.
* Failure detectors theory and safety and liveness properties
* Specifications of distributed abstractions, and failure models
* Broadcast abstractions
* Shared memory abstractions and consistency models
* The consensus problem and computability results for different distributed systems models.
* The Paxos algorithm for consensus
* Replicated state machine algorithms and dynamic reconfigurations
* Timed distributed system models and the use of physical clocks
* Relaxed consistency models and associated algorithms
* Byzantine failures and associated consensus algorithms

Disposition

The course is essentially an extended and deeper version of ID2203 course on distributed algorithms. This means that the requirement for ID2203 including the lectures, graded quizzes and programming exercises are still required. In additions the topics as outlined above are covered in much more depth by requiring the students to read and present a number of research papers related to the topics mentioned above. The papers are selected to be the most up to date research papers in the topic.

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.

P/F

Other requirements for final grade

To get Pass, the student has to do the graded quizzes, the programming excercises, and presentations of assigned research papers in local seminars.

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.