FDD3457 Program and Semantics and Analysis 6.0 credits

Programsemantik och programanalys

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 FDD3457 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

After completing the course, the successful doctoral student should be able to:

1. Account for the main semantic styles used for capturing the meaning of programs in a formal way, both in theory and on examples.
2. Relate different semantic styles, and compare their strengths and weaknesses.
3. Use these semantic styles for program analysis, optimisation and verification, both in theory and as a basis for software tools.
4. Extend a programming language with new language features, and extend its semantics accordingly.
5. Prove formally properties of a given semantics.

Course contents

Part I. Operational Semantics and Language Implementation: natural semantics, structural operational semantics, abstract machines, correctness of language implementation.

Part II. Denotational Semantics and Program Analysis: denotational semantics, fixed-point theory, program analysis and transformation.

Part III. Axiomatic Semantics and Program Verification: axiomatic semantics, program specification and verification, weakest pre-conditions, verification condition generation.

Examination

- EXA1 - Examination, 6.0 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.

Other requirements for final grade

To pass the course, doctoral students need to pass the homework assignments, the laboratory assignments, the seminar, and the written exam.

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.