



# **FID3217 Interactive Theorem Proving with Dependent Types**

## **7.5 credits**

**Interaktiv teorembevisning med beroende typer**

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

### **Establishment**

Course syllabus for FID3217 valid from Spring 2024

### **Grading scale**

P, F

### **Education cycle**

Third cycle

### **Specific prerequisites**

None

### **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:

- Construct proofs in Coq related to basic logic
- Apply proof assistant tactics
- Construct proofs in Coq related to programming language semantics
- Explain the concept of dependent types
- Explain the differences between different kinds of proof assistants
- Explain and reflect on ethical aspects of mathematics in computer science

## Course contents

The course covers several aspects of interactive theorem proving, with a focus on the Coq proof assistant. Topics covered in the course include: induction, dependent types, Curry-Howard correspondence, tactics, polymorphism, inductive types, Hoare logic, small-step operational semantics, type systems, type checking, and the simply typed lambda calculus (STLC). Guest seminars may also discuss one or two other proof assistants, such as Isabelle/Isar, Lean, HOL, and Agda.

## Examination

- INL1 - Homework/Hand-in exercise/Hand-in assignment, 7.5 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.

If the course is discontinued, students may request to be examined during the following two academic years.

The examination is conducted using take-home exercises and a final presentation.

## Other requirements for final grade

None

## 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.