



# IL2209 Advanced Logic Design

## 7.5 credits

Avancerad logikkonstruktion

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

### Establishment

Course syllabus for IL2209 valid from Autumn 2008

### Grading scale

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

### Education cycle

Second cycle

### Main field of study

### Specific prerequisites

### Language of instruction

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

### Intended learning outcomes

The aims of this course are:

- to gain knowledge of the data structures and algorithms used in modern logic synthesis tools
- to learn advanced techniques for logic circuit optimization
- to develop skills in evaluating different data structures for target applications
- to understand merits and limitations of logic synthesis.

## Course contents

1. Introduction
  - steps of design process
  - computational complexity
  - Boolean algebra, Boolean functions
2. Data structures
  - cubes
  - Binary Decision Diagrams
  - Boolean networks
3. Algorithms
  - exact and heuristic two-level optimization
  - multi-level optimization,
  - Boolean and algebraic decomposition, graph dominators
  - technology mapping
4. Non-traditional synthesis
  - Galois field optimization
  - Multiple-valued logic optimization

## Course literature

Recommended reading :

Ed. S. Hassoun and T. Sasao, "Logic Synthesis and Verification", Kluwer Academic Publishers, 2002, ISBN 0-7923-7606-4. G. De Micheli, "Synthesis and optimization of digital circuits", McGraw-Hill, 1994.

## Examination

- INL1 - Assignments, 1.5 credits, grading scale: P, F
- PRO1 - Project, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 4.5 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

Project work (ANN1; 1,5hp)

Assignments(ANN2; 1,5hp)

Examination (TEN1; 4,5hp)

It is a 5 credit course with the final evaluation based on five homework assignments (theory, 20%), a project (programming, 30%) and a final exam (50%). For PhD students, an additional task will be to read and present a paper approved by the instructor (20 min talk).

## 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.