

# Advanced Computer Architecture

Programme course

4 credits

Datorarkitektur

TDDI03

Valid from: 2017 Spring semester

**Determined by**  
Board of Studies for Computer Science  
and Media Technology

**Date determined**  
2017-01-25

## Main field of study

Computer Science and Engineering, Electrical Engineering

## Course level

First cycle

## Advancement level

G2X

## Course offered for

- Computer Engineering, B Sc in Engineering
- Engineering Electronics, B Sc in Engineering

## Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

## Prerequisites

Basic course in Computer Hardware and Architecture (Datorteknik).

## Intended learning outcomes

The aim of the course is to address the problematic of modern computers, how they work and are built. Techniques are discussed which have been developed in order to improve the performance of modern microprocessors and parallel computers. After completing the course, the students should be able to:

- Identify the main issues in modern computer systems, how they are solved and what their implications are on performance, power consumption, and cost.
- Evaluate alternative computer architectures and take the appropriate decisions regarding the choice of a particular architecture in a certain context.
- Appreciate the consequences of certain architectural decisions on the actual performance or power consumption of the processor.
- Understand specific tradeoffs between complexity/cost/performance/power-consumption in modern computer systems.

## Course content

Historical perspective, CPU, memory hierarchy, cache memory, virtual memory, instruction pipelining, Reduced Instruction Set (RISC) processors, Very Long Instruction Word (VLIW) processors, study of parallelism for performance enhancement, superscalar and parallel computer systems.

## Teaching and working methods

The course is given as a series of lectures.

## Examination

TEN1      Written exam      4 credits      U, 3, 4, 5

## Grades

Four-grade scale, LiU, U, 3, 4, 5

## Department

Institutionen för datavetenskap

## Director of Studies or equivalent

Ahmed Rezine

## Examiner

Petru Eles

## Education components

Preliminary scheduled hours: 28 h

Recommended self-study hours: 79 h

## Course literature

### Additional literature

#### Books

William Stallings, (2012) *Computer Organization and Architecture* 9th edition  
Pearson

## Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at [http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).