Computer Hardware and Architecture

Programme course

6 credits

Datorteknik

TSEA57

Valid from: 2017 Spring semester

Determined by
Board of Studies for Industrial Engineering and Logistics

Date determined
2017-01-25

Main field of study
Computer Science and Engineering, Electrical Engineering

Course level
First cycle

Advancement level
G1X

Course offered for
- Industrial Engineering and Management, M 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
To fully appreciate the course you should be able to perform simple programming in any high level language.

Intended learning outcomes
The course provides a technical base on how simple processors work and are programmed at the lowest level. The laboratory work shall through experimental implementation of a computer system provide practical knowledge in applying abstract models and troubleshooting methodology. The laboratory work shall also include practicing the ability to work in groups. Data sheets and manuals in English practice to communicate in foreign languages.
After the course you should be able to:

- (i) Program a processor at the lowest level.
- (ii) Use addressing modes and interrupt handling.
- (iii) Make calculations using binary arithmetic.
- (iv) Understand how a simple computer system is built.
- (v) Describe the processor's unifying role in a computer system.
- (vi) Troubleshoot software and hardware.
- (vii) Read and understand data sheets.
- (viii) Use a processor's input and output devices.
- (ix) Contribute to the discussion and results in a lab group.

These goals are achieved using assembler.
(Numeral refers to the corresponding comment field in IUAE matrix.)

Course content

Binary arithmetic: Numberrepresentations, integers and floating point numbers. Arithmetic-logic operations, addition, subtraction, multiplication, shift. Assembly programming: Instructions, addressing modes, interrupt. A/D-conversion.

Teaching and working methods

The course consists of lectures, laborations (4h each) and a lesson.

Examination

LAB1	Laboratory work	6 credits	U, G

The laboratory exercises test the student's ability to write and verify assembly programs in close connexion with hardware. All laboratory exercises, and an individual task, must be fulfilled to pass the lab assignment examination.

Grades

Two-grade scale, U, G

Other information

Supplementary courses:
Electronics Engineering - Bachelor Project

Department

Institutionen för systemteknik

Director of Studies or equivalent

Tomas Svensson

Examiner

Anders Nilsson

Education components

Preliminary scheduled hours: 44 h
Recommended self-study hours: 116 h

Course literature

Additional literature

Books

Clements, Alan, (2000) *The principles of computer hardware*
ISBN: 0198564546, 0198564538
Oxford : Oxford Univ. Press, cop. 2000
Foyer, Per, (2005) *Mikroprocessorteknik*
ISBN: 9144038763, 9789144038766
Lund : Studentlitteratur, 2005

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.