Computer Hardware and Architecture

Programme course

4 credits

Datorteknik

TSIU02

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study
Electrical Engineering

Course level
First cycle

Advancement level
G1X

Course offered for
- Computer Engineering, B Sc in Engineering
- Engineering Electronics, B Sc in Engineering
- Mechanical Engineering, M Sc in Engineering
- Programming, Bachelor's Programme

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 have previous knowledge in all of simpler measurements with an oscilloscope, basic electrical circuit theory and any high level language.

Intended learning outcomes

The course gives a basic introduction to how simple processors work and are programmed. After the course you should be able to:

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

These goals are achieved by using assembler.
(Numerals above refer to the corresponding comment field in the IUAE matrix.)

Course content

Binary arithmetic:
Number representations, fix- and floating point. Arithemetic-logical functions, additionm subtraction, multiplication, shifts.
Computer architecture:
Internal dataflow in a simple computer model. Instructions, instruction formats, addressing modes, input and output, exceptions.
Input- and output peripherals.
A/D- and D/A-conversions.
Mikrocontroller:
Purpose and features. Built-in peripherals, timers, clocking alternatives, blackout och brownout.

Teaching and working methods

The course consists of lectures, lessons and laboratory exercises. During the course there is a revision of tecnical reports together with examiners of the course Switching Theory and Logical Design.

Examination

UPG1	Laboratory work	4 credits	U, G

The laboratory exercises test the student's ability to write and verify assembler programs. Furthermore the ability to perform input-output, interrupt handling as well D/A- and A/D-conversion is tested. All laboratory exercises must be fulfilled to pass the lab assignment examination.
Grades are given as ’Fail’ or ’Pass’.

Grades

Two-grade scale, U, G

Other information

Supplementary courses: Project with Microcontroller, Microcomputer, Project Laboratory

Department

Institutionen för systemteknik

Director of Studies or equivalent

Tomas Svensson

Examiner

Michael Josefsson

Course website and other links

http://www.isy.liu.se/edu/kurs/TSIU02/

Education components

Preliminary scheduled hours: 44 h
Recommended self-study hours: 63 h

Course literature

Additional literature

Books

Foyer, Per, *Mikroprocessorteknik* Studentlitteratur

Other

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.