IK1001 Computer Systems and Data Communication 7.5 credits

Datorsystem och datakommunikation

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

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

Establishment

Course syllabus for IK1001 valid from Autumn 2008

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Completed upper secondary education including documented proficiency in Swedish corresponding to Swedish B and English corresponding to English A. For students who received/will receive their final school grades after 31 December 2009, there is an additional entry requirement for mathematics as follows:

documented proficiency in mathematics corresponding to Mathematics A. And the specific requirements of mathematics, physics and chemistry corresponding to Mathematics D, Physics B and Chemistry A.

Language of instruction

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

Intended learning outcomes

After completing the course, students should be able to:

*identify, define and describe various computer system hardware components and their relationships to each other. The student should be able to minimize logic functions with Karnaugh maps method and able to synthesize a simple Mooremachine.
* Describe and compare different representations of data as integers, floats, characters and machine instructions.
* able to account for the C programming language's memory model and know and be able to use pointers.
* able to sketch the typical arrangement of relationships between records in the database context. The student should be able to account the function of various disc memory and file organization , and be able to describe and compare fundamental compressed audio and video formats with respect to time and space performance .
* describe and explain the essential techniques for processor architecture RISC/CISC-, pipelined, superscalar and multi-core processors, and the basic functionality of the different types of caches.
* be able to discuss operating system functions that multithreading by timer interrupt and system call and be able to describe the principles of virtual memory.
* able to explain the main principles of the Internet's physical structure and describe the function of routers and various types of servers and be able to describe the principles of asynchronous / synchronous serial communication.
*knowthenamesandabbreviationsforfrequentlyusedconceptsinthe aboveareas.

Course contents

Electronics Components:
Diode LED photodiode, diode gates, MOS transistor, CMOS gates.
Digital Technology:
Boole algebra. Karnaugh maps. AND OR and NAND and NOR logic. Addition circuit, MUX / DMUX. Latch, D-tilt, Moore-automaton.
Maskinaritmetik:
Hex / octal numbers, two-complement representation, floating point, ASCII and Unicode.
Data structures:
Array, Struct, Stack, Queue / Buffer, Linked list.
File organization and file formats:
FAT, NTFS. RAID.
PDF. Data Compression, MPEG and MP3.
Processorarkitecture:
Harvard / Von Neumann, RISC / CISC. Examples of instruction set (PIC micro). Pipeline

and Cache Memory.
Operating system:
Threads, PCBs, Interrupt, Preemptive / Prioritized scheduling. Memory allocation, virtual memory.
Data communication:
Ethernet. LAN, WAN, Router, OSI TCP / IP. Client / Server architecture. Asynchronous and synchronous serial communication.
Terminologyandabbreviationswithin thecoursetopics.

Disposition

Lectures and laboration work. Web-based problem assignements and written exam.

Course literature

Systems Architecture, Burd, Stephen. Course Technology (Thomson)
ISBN: 0-619-21692-1

Examination

- INL1 - Hands in Work, 1.5 credits, grading scale: P, F
- LAB1 - Laboratory Work, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 3.0 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.

Laboration work gives bonus towards the written examination.

Other requirements for final grade

Writtenexamination(TEN1,3credits).GradingA/B/C/D/E/Fx/F.
Approved Laboration work (LAB1; 3 credits). Delbetyg P / F.
Approvedindividualassignments(ANN1;1.5hp).DelbetygP/F.

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.