IK1203 Networks and Communication 7.5 credits

Nätverk och kommunikation

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

Establishment

Course syllabus for IK1203 valid from Spring 2010

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

- The goals of the course is to teach the basics of networking and communication. For those interested in specializing in networking, it provides the fundamentals on which later courses build.
- For those focusing on other areas of IT, it provides the basic knowledge needed to understand how networks and communication can be securely and effectively utilized in systems and applications.

After completing the course, students should be able to:

- Describe and explain the basic terminology used in discussing networking and communication.
- Analyze communication scenarios and explain what methods and algorithms to use to offer a communication service meeting the requirements of the scenario, alternatively explain the reasons why such a service cannot be implemented.
- Explain and analyze the behavior of networks using different models of error, flow and congestion control, and predict how different network architectures will behave in response to different events, conditions and topologies.
- Explain the function of the different layers of the OSI/Internet models and how different layers interact with each other.
- Explain and implement the basic algorithms and mechanisms for error detection, error correction, flow control, congestion control and routing.
- Implement and analyze the behavior of simpler Internet applications and their protocols.
- Explain how different functions, concepts and architectures are expressed in common networking equipment and protocols. For example, why routers are constructed the way they are and why TCP is designed and behaves the way it does.
- Compute and/or approximate the performance of communication systems, and suggest improvements.
- Understand how protocols and networks can be attacked, and suggest ways to detect, stop and prevent security problems.

Course contents

- Flow control and error control: flow control (stop&wait, sliding window), error detection and error handling, error correcting codes, retransmission (ARQ).
- Layered models: overview of OSI and TCP/IP.
- LAN (Local Area Network) and LAN-systems: topologies, access- techniques and protocols, token ring, Ethernet, wireless networks bridged networks, spanning tree computation and VLAN.

- Packet and circuit switching: WAN (Wide Area Network) and public networks, principles, characteristics and protocols.
- Internetworking and IP: design principles and building blocks, connection oriented vs. connectionless protocols, Internet routing and Internet Protocol (IP).
- Transport layer protocols: TCP, UDP.
- Communcation models: "Client-server" and "peer-to-peer".
- Applications: DNS, SMTP, FTP, HTTP, Telnet mm.
- Network programming.

Course literature

James F. Kurose, Keith W. Ross: Computer Networking: A Top-Down Approach, 5th edition ISBN 0-13-136548-7, Pearson/Addison Wesley.

Examination

- UPG1 - Assignment, 1.5 credits, grading scale: P, F
- TENA - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LABA - Laboratory Work, 3.0 credits, grading scale: P, 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

Written exam. (TEN1; 5,3 hp)
Laboratory course (LAB1; 2,2 hp))

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.