IK2217 Advanced Internetworking II 7.5 credits

Avancerad Internetteknik II

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

Establishment

Course syllabus for IK2217 valid from Spring 2019

Grading scale

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

Education cycle

Second cycle

Main field of study

Information and Communication Technology, Computer Science and Engineering, Electrical Engineering

Specific prerequisites

Students who attend this course are required to have passed IK2215 (Advanced Internetworking), or have equivalent knowledge in Internetworking and Computer Communications.

Language of instruction

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

Intended learning outcomes

The purpose with the course is to give a deep understanding of how communication networks are built with links, switches, and routers as well as of communication protocols at layer 3 (network layer) and layer 2 (link layer). The students will get broad and deep insight into different systems and types of networks, and how they are used for different purposes and application areas. The students will also gain practical experience of designing and managing TCP/IP networks.

This means that, after the course, students will be able to:

- Describe methods and devices that are used to construct switched networks, and describe and discuss factors that influence choice of methods and equipment.
- Explain different techniques for routing in switched networks, and perform routing calculations using “spanning tree” methods.
- Explain the concept of “virtual networks” and describe different methods for realizing virtual networks
- Describe different techniques for protection against faults in links and nodes, and for increasing the degree of network availability
- Analyze and compare protocols with respect to network design implications, cost, performance, and management properties.
- Design, configure and manage complex local area networks with Ethernet-switches and routers.
- Give examples of and describe current research problems within the topics included in the course.
- Give examples of and explain social, ethica, and environmental aspects of sustainable development within the area of communication systems.

Course contents

IP, the Internet Protocol, has become the universal protocol to interconnect networks across the world. IP has remained more or less the same for many years, while the dramatic changes in capacity, connectivity, services, and so on, mainly due to the developments in the underlying network infrastructures. For operators, enterprises, campuses, and so on, it is increasingly important to have a good understanding of how the underlying network technologies are used in order to design reliable, cost-efficient networks.

This course deals with the areas of link and network layer protocols and networks, and intends to give a good understanding of recent trends and developments in the area of communication and network technologies. The topics may differ somewhat between different course rounds, but examples of topics that are included are MPLS (Multiprotococl Label Switching), Datacenter networks, and Internet-of-Thnigs.

To further illustrate these principles and get hands-on experience, the course contains a set of laboratory assignments and a project assignment.

Disposition

Teaching language: English

Course literature

The course literature mainly consists of scientific articles within the topics inlcuded in the course.

Examination

- PRO1 - Project, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - 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.

To receive grade "pass", the student should be able to describe and explain design principles for protocols, methods and devices in switched and routed networks, as well as be able to apply these protocols and methods in real networks.

To receive a higher grade, the student should also be able to critically evaluate and assess different communication protocols as well as be able to compare and explain advantages and disadvantages with various protocol designs.

Other requirements for final grade

The course is divided into three parts, and to receive a final grade "pass" all three parts must be approved:

- Written exam (A-F)
- Laboratory work (Pass/Fail)
- Project assignment (Pass/Fail)

The final degree is based on the result of the written exam.

Grading: A-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.