IK2554 Röst över IP (VoIP) i praktiken 7,5 hp

Practical Voice Over IP (VoIP)

Fastställande

Kursplan för IK2554 gäller från och med HT08

Betygsskala

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

Utbildningsnivå

Avancerad nivå

Huvudområden

Informations- och kommunikationsteknik, Informationsteknik

Särskild behörighet

Data and Computer Communications or equivalent knowledge (such as 2G1700)

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

This course will give both practical and general knowledge on the protocols that are the basis of the Internet. After this course you should have a good knowledge about Internet protocols and internetworking architecture. You should have a general knowledge aiding you in reading research and standardization documents in the area.

Learning Outcomes

Following this course a student should be able to:

* Understand the principles on which internetworking is based - which define the Internet (both what it is and why it has proven to be so succesful)

* Understand TCP/IP protocol stack, layering, encapsulation and multiplexing

o Understand multiplexing, demultiplexing, upward and downward multiplexing

o Encapsulation as used for Mobile IP, Virtual Private Networks (VPNs), IP security, ... and other tunnelling protocols

o Understand how information is encoded in headers and how the choice of this encoding and field size may effect the use and evolution of a protocol

o Understand how data is encoded in the body of a packet and how this may effect internetworking - especially in the presence of firewall and network address translators.

* Understand IP Addressing, subnetting and address resolution - including the interaction of protocols across layers

* Understand a number of higher layer protocols including the security risks and performance limitations of each

* Understand the basic details of routing and routing protocols (RIP, BGP, OSPF) - with an emphasis on their limitations and behaviors

* Understand autoconfiguration and naming (BOOTP, DHCP, DNS, DDNS, DNSsec, ENUM, ...) - with an emphasis on risks, limitations, scaling, and evolution

* Understand the nature and pressures on the design and operations of internets - particularily on scaling, performance, delay bounds, due to new Internet applications (VoIP, streaming, games, peer-to-peer, etc.

* Understand the advantages and disadvantages of IPv6 (in comparison to IPv4)

* Read the current literature at the level of conference papers in this area.

o While you may not be able to understand all of the papers in journals, magazines, and conferences in this area - you should be able to read 90% or more of them and have good comprehension. In this area it is especially important that develop a habit of reading the journals, trade papers, etc. In addition, you should also be aware of both standardization activities, new products/services, and public policy in the area.

* Demonstrate knowledge of this area in writing.

o By writing a paper suitable for submission to a trade paper or national conference in the area.

Kursinnehåll

The course consists of 14 hours of lectures, 14 hours of recitation (övningar) and 40-100 hours of written assignment.

Topics

* What the Internet is and why it has proven to be so succesful.

* What protocols are required to allow internetworking (IP, TCP, UDP, ICMP, etc.)

* Understanding of TCP/IP protocol stack, layering, encapsulation and multiplexing

* IP Addressing, subnetting and resolution

* Transport protocols, including UDP and TCP

* Details of routing and routing protocols (RIP, BGP, OSPF)

* Autoconfiguration and naming (BOOTP, DHCP, DNS)

* Internet applications (VoIP, SMTP, etc)

* Multicasting, VPNs, Mobile IP, and security

* IPv6 and some differences with IPv4

Kurslitteratur

TCP/IP Protocol Suite, Behrouz A. Forouzan

Upplaga: 3rd edition Förlag: McGraw-Hill År: 2005

ISBN: 0071115838

Övrig litteratur

Additional reference book:

Muhhub Hassan and Raj Jain, Higher Performance TCP/IP Networking: Concepts, Issues, and Solutions Pearson Prentice-Hall, 2004, ISBN 0-13-127257-8.

Examination

 • PRO1 - Projekt, 7,5 hp, betygsskala: A, B, C, D, E, FX, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Övriga krav för slutbetyg

A written report:
o The length of the final report should be ~7-8 pages (roughly 3,000 words) for each student
o The report should clearly describe: 1) what you have done; 2) if you have done some implementation and measurements you should describe the methods and tools used, along with the test or implementation results, and your analysis.
o The topic for the paper should be selected in consultation with the instructor.
Language: the report can be written in Swedish or English - (better feedback may be available if the report is written in English)

Etiskt förhållningssätt

• Vid grupparbete har alla i gruppen ansvar för gruppens arbete.

• Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.

• Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.