



# IK1552 Internetworking 7.5 credits

## Internetteknik

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

On 2019-10-15, the Head of School of EECS has decided to establish this official course syllabus to apply from the spring semester 2020 (registration number J-2019-2098).

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Language of instruction

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

## Intended learning outcomes

After passing the course, the student shall be able to

- give an account of the principles that the Internet technique is based on and that define Internet.
- give an account of TCP/IP-protocol stack, layer, encapsulation and multiplexing
- give an account of multiplexing demultiplexing, upward and downward multiplexing
- give an account of encapsulation that is used for mobile IP, virtual private networks (VPN), IP security and other tunnelling protocols
- give an account of how information is coded in headings and how the choice of this encoding and field size can influence the use and the evolution of a protocol
- give an account of how data are coded in the package and how this can influence the Internet technique particularly in the presence of firewall and network address translators.
- account for IP-addressing, subnetting and address resolution including interaction between protocols across layers
- give an account of protocols for higher layers including security threats and performance limitations for each
- give an account of the basic details for routing and routing protocols (RIP, BGP, OSPF) - with an emphasis on their limitations and behaviors.
- account for autoconfiguration and naming (BOOTP, DHCP, DNS, DDNS, DNSsec, ENUM, etc), with an emphasis on risks, limitations, scaling and evolution.
- give an account of the nature and pressures on the design and operation of internets, particularly on scaling, performance and delay bounds, due to new Internet applications (VoIP, streaming, game, peer-to-peer, etc)
- give an account of advantages and disadvantages with IPv6 compared with IPv4.
- read and extract information from current literature in the form of conference papers in the area.
- describe and explain the field of Internet technique by writing a text that is appropriate as contribution to a national conference in the area.

in order to

- obtain practical and general knowledge of the protocols that form the basis for Internet.
- obtain good knowledge of internet protocol and architecture for Internet technique.
- be able to read research and standardization documents.

## Course contents

- What Internet is and why it has turned out to be so successful.
- Protocols that are required for Internet technique (IP, TCP, UDP, ICMP, etc).
- TCP/IP-protocol stack, layer, encapsulation and multiplexing
- IP-addressing, subnetting and resolution
- Transport protocols including UDP and TCP.
- Details for routing and routing protocols (RIP, BGP, OSPF)

- Autoconfiguration and naming (BOOTP, DHCP, DNS)
- Internet applications (VoIP, SMTP, etc).
- Multicasting, VPN, Mobile IP and safety.
- IPv6 and certain differences with IPv4.

## Specific prerequisites

General entry requirements and Mathematics D, Physics B and Chemistry A

## Examination

- INL1 - Assignment, 1.5 credits, grading scale: P, F
- PRO1 - Project, 6.0 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.

The report can be written in Swedish or English.

## Other requirements for final grade

A written report (6 ECTS):

The length of the final report be ~7-8 pages (approximately 3.000 words) for each pupil. The report should describe clearly: 1) what you have made 2) if you have made some implementing and measure you should describe the methods and tools that are used together with the test or result implementation and your analysis. The subject for papers should be chosen in consultation with the teacher. A further written assignment is required (1.5 ECTS). Information about this will be presented in the class.

## 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.