



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 2024

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Knowledge and skills in Java programming, 6 credits, corresponding to completed course ID1018/DD1337 alternatively a completed course in basic programming such as DD1310-DD1319/DD1321/DD1331/DD100N combined with a completed course in Java programming corresponding to DD1380.

Knowledge in Boolean algebra, 1,5 credits, corresponding to completed course IE1204/IE1205, alternatively ANN1 in IS1500.

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 should be able to

- describe and explain basic terms and concepts used in networking and communication
- analyse communication scenarios and application requirements and explain which methods and algorithms that are appropriate to offer a desired communication service
- explain, model and analyse the behaviour of networks using different methods for error handling and flow control
- explain different methods for congestion control and how they react to different events and conditions in the network
- explain the functions of protocols of the different layers of the Internet model and how different layers interact with one another
- explain and compare basic algorithms and mechanisms for path selection and how they react to different events and conditions in the network
- use socket programming to implement simple applications according to the client/server model
- design, implement and analyse the behaviour of simple Internet-based applications and their protocols
- design and configure simpler networks with basic services such as DHCP and DNS
- explain different functions and concepts concerning equipment for communication and networks
- calculate or estimate performance in terms of delay, throughput and utilization in interconnected networks

in order to

- understand and utilise computer communication and computer networks in a reliable and efficient way in systems and applications
- lay the foundation for continued studies in the area

Course contents

- Internet's structure and different components.
- Layered network models: overview of the Internet model.
- Communication models: "Client-server" and "peer-to-peer".
- Internet-based applications and their protocols: DNS, SMTP, HTTP etc.
- Design and implementation of applications according to the client/server model. Socket programming.

- Principles of transport protocols and the services they offer. Internet-based transport protocols: TCP and UDP.
- Flow regulation, congestion control and error handling. Stop-and-wait, Go-Back-N as well as window handling and congestion control in TCP.
- Interconnected networks: Internet Protocol (IP), datagram services, packet switching, routing protocols and routing algorithms.
- Local area networks: topologies, access control, Ethernet, wireless local area networks, switched local area networks, link protocols. Network in data centers. Detection of transmission errors.

Examination

- LABB - Laboratory work, 1.5 credits, grading scale: P, F
- TENT - Digital examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- PROJ - Project assignment, 1.5 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.

TENT is conducted as a continuous digital examination and is given in English. Written solutions may be submitted in Swedish or English.

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.