SYLLABUS

Computer Communications 7.5 credits D0002E

Datorkommunikation

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2023-01-13

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LULEÅ TEKNISKA UNIVERSITET

Computer Communications 7.5 credits D0002E

Datorkommunikation

First cycle, D0002E

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Datorkommunikation	Computer Technology

Main field of study

Computer Science and Engineering

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and courses of at least 60 credits at first cycle including the following knowledge/courses: Object oriented programming (D0010E Object-oriented Programming and Design), Basic knowledge in mathematics (M0049M Linear Algebra and Differential Equations), Boolean argebra (M0009M Discrete Mathematics), General computer skills and experience of rapport writing.
Knowledge in English, equivalent to English 6.

Selection

The selection is based on 1-165 credits.

Course Aim

The goal with the course is that the student will acquire broad knowledge in the area of computer communications , practical skills in basic analysis of performance metrics and scalability of communication solutions. The course material covers the functionality from physical up to the application layers of the Internet architecture including basics of network security.

- The student should demonstrate broad knowledge in the area of computer communications by being able to:
    - Describe the purpose of OSI reference model and major principles of current network technologies (Ethernet – IEEE 802.3, WiFi - IEEE 802.11).
    - Describe the difference between the packet and the circuit-switching communication technologies.
    - Present in details major protocol representatives on MAC, IP, Transport and Application layer of the TCP/IP protocol stack.
    - Describe different methods for reliable data transmission in the Internet.
    - Describe principles behind congestion control in the Internet.
    - Describe and explain the quality of service requirements for multimedia applications.
- Identify and describe the details of network security threats and attacks.
- The student shall be able to analyze and critically evaluate different solutions by being able, amongst other:
    - Compute TCP throughput in a sample network.
    - On a sample graph compute routes using major routing algorithms (Bellman-Ford, Dijkstra, etc.) and identify differences between them.

Contents

- Introduction to computer networks and internetworking
- Network programming, sliding window protocols
- Application protocols (HTTP, SMTP, P2P)
- Internet protocols (IPv4, IPv6, TCP, UDP, DNS, DHCP, ARP, Mobile IP)
- Congestion control in the Ineternet
- Routing, error detection and recovery
- Network technologies (Ethernet, WLAN)
- Multimedia networking and supporting network mechanisms
- Encryption algorithms, authentication
- Different forms of security related attacks
- Programming of applications communicating over the Internet.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.

The course consists of lectures, on-line home assignment and labs. There are no optional educational moments in this course. The structure of the course makes it necessary for students that do not pass to retake the unsuccessful examination moment next time the course is given.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Continuous examination with two quizzes, homework assignments, labs, which give certain number of credits (see table “Items/Credits” below). The final score is calculated from the total number of credits collected by a student.

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term “unauthorized aids” refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Overlap

The course D0002E is equal to SMD123

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Two mid-term exams	G U 3 4 5	3	Mandatory	S10	
0003	Assignment report	G U 3 4 5	2.5	Mandatory	S10	
0004	Laboratory work	U G#	2	Mandatory	S10	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Robert Brännström, HUL at the Department of Computer Science, Electrical and Space Engineering 2023-01-13

Syllabus established

by the Department of Computer Science and Electrical Engineering 2007-02-28