Computer Networks II: Network Management (E761031)

Course size   *(nominal values; actual values may depend on programme)*

     Credits 6.0   **Study time** 180 h   **Contact hrs**   60.0h

Course offerings in academic year 2023-2024

Lecturers in academic year 2023-2024

Offered in the following programmes in 2023-2024	crdts	offering

Teaching languages

     Dutch

Keywords

     routing, network security, network management, IPv6

Position of the course

     This course focuses on the control, configuration and security of computer networks.

Contents

- Configuration of network interfaces
- Static routing: configuration of forwarding tables
- Dynamic routing: RIP, EIGRP, OSPF, and BGP
- Principles of authentication, tunneling and encryption
- Network security: firewalls
- Network management: protocols and tools
- IPv6: addressing, ICMPv6 Neighbor Discovery, autoconfiguration, 6to4 tunneling
- Principles of wireless networking

Initial competences

Strict sequence: the student must have passed Computer Networks I: basic protocols (E761020) to be allowed to enroll for this course. (only if the course is part of the program the student followed before):
Students have successfully taken the course 'Computer Networks I: Basic Protocols' ('Computernetwerken I: basisprotocollen') (i.e. obtained a credit) or have acquired the aspired learning competences in another way (mandatory succession as defined in the Curriculum Rules of the Faculty of Engineering and Architecture, cf. http://www.ugent.be/ea/nl/onderwijs/studentenadministratie/curriculum.htm)
Advisory initial competences:

- Knowing the basic technologies of computer networks and the techniques used in the upper layers of networks: IPv4 adressing, CIDR subnetting, forward and reverse DNS resolution, routing, IP, QoS, ARP, TCP, trafic control, congestion control.
- Having acquired skills to apply scripting languages techniques , more specifically perl, including the use of arrays and hashes, regular expressions, references and subroutines.
- Knowing the basic principles of computer architecture (including interrupts, kernel modus, the memory hierarchy, caching) and of the architecture of operating systems (including multitasking, proces states and transitions, proces switching, threads, proces scheduling, mutual exclusion, proces synchronisation, semafores, deadlocks, memory management, paging and segmentation, virtual memory)

Final competences

     1   Set up networks and configure routing.

2 Analyze network traffic using tools such as Wireshark.

3 Analyze and correct routing.

4 Understand network security mechanisms, including authentication, encryption and associated protocols.

5 Secure networks using firewalls.

6 Managing networks using SNMP and NetConf.

7 De IPv6 addressering en berichtenstructuur begrijpen.

8 Understand Neighbor Discovery processes.

9 Understand several techniques for the migration from IPv4 to IPv6.

10 Configure heterogeneous IPv4/IPv6 internetworks.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, Seminar: practical pc room classes

Learning materials and price

Textbook (same as used for Computernetwerken I): "Computernetwerken: Een top-downbenadering", 7de editie, James F. Kurose, Nov 2018, 731p, ISBN: 9789043036214, indicative price: 68,5 euro, in combination with presentation material (slides) on Ufora. No compulsary need for laptop or particular software.

References

• "Computer Networks", Andrew S. Tanenbaum; fourth edition; Pearson Education International, 2003, ISBN 0-13-038488-7, of Nederlandstalige versie

• "TCP/IP Illustrated, Volume 1", W. Richard Stevens, Addison Wesley, 1994, ISBN 0- • 201-63346-9 "Networks and Telecommunications : Design and Operation", M. Clark, Wiley, second edition, 1997, ISBN 0 47197346 7

Course content-related study coaching

An appointment with the lecturer can always be made.

Assessment moments

end-of-term assessment

Examination methods in case of periodic assessment during the first examination period

Written examination with open questions

Examination methods in case of periodic assessment during the second examination period

Written examination with open questions

Examination methods in case of permanent assessment

Skills test, Report

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Calculation of the examination mark

2/3 written examination and 1/3 permanent evaluation