

Computer Networks II: Network Management (E761031)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size (nominal values; actual values may depend on programme)
Credits 6.0 Study time 180 h Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2020-2021

| | | | | |
|----------------|-------|------|------------------------------------|--------|
| A (semester 2) | Dutch | Gent | lecture | 24.0 h |
| | | | seminar: practical PC room classes | 36.0 h |

Lecturers in academic year 2020-2021

| | | |
|-------------------|------|--------------------|
| Tavernier, Wouter | TW05 | lecturer-in-charge |
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Offered in the following programmes in 2020-2021

| | crdts | offering |
|---|-------|----------|
| Bachelor of Science in Engineering Technology (main subject Electronics and ICT Engineering Technology) | 6 | A |
| Bachelor of Science in Engineering Technology (main subject Information Engineering Technology) | 6 | A |
| Linking Course Master of Science in Electronics and ICT Engineering Technology (main subject Electronics Engineering) | 6 | A |
| Linking Course Master of Science in Electronics and ICT Engineering Technology (main subject Embedded Systems) | 6 | A |
| Linking Course Master of Science in Electronics and ICT Engineering Technology (main subject ICT) | 6 | A |
| Linking Course Master of Science in Information Engineering Technology | 6 | A |
| Preparatory Course Master of Science in Information Engineering Technology | 6 | A |

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

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 addressing, CIDR subnetting, forward and reverse DNS resolution, routing, IP, QoS, ARP, TCP, traffic 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 adressering 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

Guided self-study, lecture, online discussion group, seminar: practical PC room classes, lecture: response lecture, online seminar: coached exercises, online 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, in combination with presentation material (slides) on Ufora.
No compulsory 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.

Evaluation methods

end-of-term evaluation

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

Written examination with open questions

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

Written examination with open questions

Examination methods in case of permanent evaluation

Skills test, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Calculation of the examination mark

2/3 written examination and 1/3 permanent evaluation