

Course

NP - F07_Networks and Protocols

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^ General information

Long name	F07_Networks and Protocols
Approving CModule	NP_BaET , NP_BaTIN
Responsible	Prof. Dr. Andreas Grebe Professor Fakultät IME
Level	Bachelor
Semester in the year	winter semester
Duration	Semester
Hours in self-study	60
ECTS	5
Professors	Prof. Dr. Andreas Grebe Professor Fakultät IME
Requirements	Boole Operations, AND, OR, XOR Binary numbers Basic Computer Architecture Basic Knowledge of Operating Systems (Unix/Linux preferred) Basic programming skills
Language	German
Separate final exam	Yes

Final exam

Details

In a final examination (written, optionally oral), the students demonstrate their competences in summary form. The exam comprises the following sub-areas, in which six taxonomy levels (reproduce, understand, apply, analyze, synthesize, and evaluate) are included.

1.) A good command of basic concepts, concepts and techniques. Typical tasks are multiple-choice questions, open questions, evaluation of

statements regarding their correctness.

2.) Application of planning and valuation techniques. Typical tasks are planning tasks of networks or subsystems.

3.) Examination of proposed solutions for correctness, identification of errors in statements or given networks. Typical tasks include the analysis of given network architectures and system statements.

Minimum standard

Achievement of the individual minimum score per exam, typically 50% of maximum score.

Exam Type

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3.) Examination of proposed solutions for correctness, identification of errors in statements or given networks. Typical tasks include the analysis of given network architectures and system statements.

^ Lecture / Exercises

Learning goals

Knowledge

Fundamentals of architectures and topologies of computer networks, metrics, LAN, MAN WAN, communication and layer models according to ISO/OSI, IETF TCP/IP, IEEE, bit transmission and data interconnections, Ethernet technology, IP addressing and subnetting, IP routing and routing protocols, frame switching and virtual LAN, transport protocols, application protocols and communication patterns

Excerpt of the contents:

ISO/OSI reference models, TCP/IP model, IEEE model, switch, router, host, transmission media, Ethernet, 100BASE-Tx, 1000BASE-T, ARP, addressing IPv4, IPv6, DHCP, ICMP, switched LAN, virtual LAN (VLAN), static routing, RIP, OSPF, transport protocols UDP, TCP, QUIC, applications DNS, HTTP, FTP, TFTP, Telnet, SSH

Skills

Analyze networks and systems using suitable tools and present them graphically. Integrate systems into networks. Planning and setting up (sub)networks. Estimate and analyse the performance of computer networks. Obtaining information from original English sources.

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Exercises (whole course)	2
Exercises (shared course)	0

Separate exam

none

^ Practical training

Learning goals

Knowledge

Knowing, structuring, classifying, structuring basic concepts and technologies of computer networks, structuring tasks in technical communication, assigning to relevant standardizations and transferred to network design and client/server applications, assigning and naming protocols (applications, transport, network, Ethernet, transmission technology), explaining protocol mechanisms, setting out and structuring tasks and technical parameters. Master network analysis techniques and tools, know network design steps and methods for network planning.

Skills

Analyze networks and systems using suitable tools and present them graphically.
Integrate systems into networks.
Planning and setting up (sub)networks.
Estimate and analyse the performance of computer networks.
Systematic troubleshooting and correction.
Evaluate information from original sources and apply it to networks.

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	1
Tutorial (voluntary)	0

Separate exam

Exam Type

working on practical scenarion (e.g. in a lab)

Details

There are several lab dates with different tasks.

The following tasks have to be completed for each date:

Independent solution of the preparatory self-learning tasks (homework).

Solution of the network design, implementation and analysis tasks in a small team (typically 2 students), if necessary with the help of assistance.

Optional participation in Cisco Academy CCNA (Cisco Certified Network Associate) modules is possible. The successful completion of selected CCNA 1 and CCNA 2 labs is recognized.

Minimum standard

Successful participation in all lab dates, correct solution of all self-learning tasks and completion of all tasks of the lab date.