# Technology
# Arts Sciences
# TH Köln

Course
# NP - F07_Networks and Protocols

Version: 8 | Last Change: 29.04.2022 13:04 | Draft: 0 | Status: vom verantwortlichen Dozent freigegeben

## ︿ General information

| | |
|---|---|
| **Long name** | F07_Networks and Protocols |
| **Approving CModule** | NP_BaET, NP_BaTIN |
| **Responsible** | Prof. Dr. Andreas Grebe<br>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<br>Professor Fakultät IME |
| **Requirements** | Boole Operations, AND, OR, XOR<br>Binary numbers<br>Basic Computer Architecture<br>Basic Knowledge of Operating Systems (Unix/Linux prefered)<br>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

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.

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## ⌃ 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 |

| Tutorial (voluntary) | 0 |

## Separate exam

## ^ 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 scenario (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.