

COURSE DETAIL

NETWORK PROTOCOLS AND ARCHITECTURES

Country

Germany

Host Institution

Technical University Berlin

Program(s)

Technical University Berlin

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Computer Science

UCEAP Course Number

150

UCEAP Course Suffix**UCEAP Official Title**

NETWORK PROTOCOLS AND ARCHITECTURES

UCEAP Transcript Title

NET PROTOCLS & ARCH

UCEAP Quarter Units

5.50

UCEAP Semester Units

3.70

Course Description

This course explores advanced principles of computer networks based on fundamentals of the topic. The topics are protocol mechanisms, principles of implementation, network algorithms, advanced network architectures, network simulation, network measurement as well as techniques of protocol specification and verification. Protocols mechanisms and techniques of protocols used in network protocols include signaling, separation of control and data channel, soft state and hard state, using of randomization, indirection, multiplexing of resources, localization of services, and network virtualization (overlays, VxLANs, peer-to-peer networks). The identification and study of principles that lead to the implementation of network protocols include system principles, reflections on efficiency, and caveats/ case studies. Network architecture examines “the big picture”. It identifies and studies principles that lead the design of network architectures. The course considers substantial questions rather than specific protocol and implementation tricks, which include internet design principles, lessons learned from the internet, architecture of telephone network, and circuit switching versus packet switching (revisited). Protocols cover network algorithms, self stabilization (examples of routing), Kelly's congestion control framework, and closed loop control on the example of TCP. Simulation, oblivious routing and routing in cryptocurrency networks includes principles of discrete event simulation, analysis of simulation results, packet versus flow models, bounding strategies (e.g., Chernoff bounds), and Gaussian distributions.

Language(s) of Instruction

English

Host Institution Course Number

0432 L 810

Host Institution Course Title

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Host Institution Course Details

<https://moseskonto.tu-berlin.de/moses/modultransfersystem/bolognamodule/beschre...>

Host Institution Campus

Host Institution Faculty

Host Institution Degree

Host Institution Department

Institut für Telekommunikationssysteme

Course Last Reviewed

2025-2026

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