# Computer networks - course description

## General information

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| Course name | Computer networks |
| Course ID | 11.3-WE-INFP-ComNet- |
| Faculty | Faculty of Computer Science, Electrical Engineering and Automatics |
| Field of study | Computer Science |
| Education profile | academic |
| Level of studies | First-cycle Erasmus programme |
| Beginning semester | winter term 2019/2020 |

## Course information

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|---|---|
| Semester | 3 |
| ECTS credits to win | 6 |
| Course type | obligatory |
| Teaching language | english |
| Author of syllabus | • dr hab. inż. Marcin Mrugalski, prof. UZ |

## Classes forms

| The class form | Hours per semester (full-time) | Hours per week (full-time) | Hours per semester (part-time) | Hours per week (part-time) | Form of assignment |
|---|---|---|---|---|---|
| Lecture | 30 | 2 | - | - | Exam |
| Laboratory | 30 | 2 | - | - | Credit with grade |

## Aim of the course

Student is able: configurate switches and routers, describe distance vector and link state routing protocols, chose appropriate interior and exterior gateway routing protocols, manage IP addresses and apply NAT and PAT mechanisms.

Student has knowledge about sources of hazards in security of computer networks and is able to prevent them with the application of the ALC, Firewalls, IPS, IDS and DMZ. Student is able to describe, chose and apply different WAN technologies.

## Prerequisites

Computer networks I

## Scope

IP address management: Sub-netting with the application of VLSM. IP addresses aggregation. Private addressing with NAT and PAT implementation.

Routers: Architecture, application and advanced configuration. Static and dynamic routing. Default routing. Full-class and classless routing. Link state and distance vector routing protocols: RIPv1, RIPv2, IGRP, OSPF, EIGRP. Interior and exterior gateway routing protocols. Network convergence: split horizon, count to infinity, hold-down timers and route poisoning methods. Load balancing in computer networks.

Network security: Standard and extended access control list configuration. Dynamic access control list. Reflexive access control list. Context-base access control list. Firewalls, IPS, IDS and DMZ.

Ethernet switches: architecture, futures and configuration of the switches in the hierarchical computer networks. VLANs and their configuration. STP, RSTP and Rapid PVST+ algorithms. VLANs internetworks routing.

WAN technologies: ISDN, xDSL, ATM, FrameRelay, SONET, UMTS, MPLS, Metroethernet.

Introduction to routers: Router components and operation. User interface and configuration principle. Troubleshooting.

## Teaching methods

Lecture, laboratory exercises

## Learning outcomes and methods of theirs verification

| Outcome description | Outcome symbols | Methods of verification | The class form |
|---|---|---|---|
| Can use NAT and PAT translation techniques | | • a test | • Lecture<br>• Laboratory |
| Can characterize and point out the differences between static and dynamic routing. | | • a test | • Lecture |
| Is aware of potential risk affecting computer network safety and is able to prevent them by application of various safety techniques e.g., ACL. | | • a test | • Lecture |
| Can creatively develop the division of IP address space into subnets using VLSM technique. | | • a test | • Laboratory |

| Outcome description | Outcome symbols | Methods of verification | The class form |
|---|---|---|---|
| Knows the structure and can carry out an advanced configuration process of routers and switches. | | • a test | • Lecture |
| Can choose the proper routing protocol necessary for the optimal functioning of the routing inside and between autonomous systems. | | • a test | • Lecture |
| Can characterize routing protocols operating according to a distance vector and link state. | | • a test | • Lecture |
| Can implement class and classless routing in computer networks. | | • a test | • Laboratory |

## Assignment conditions

Lecture – the passing condition is to obtain a positive mark from the final test.

Laboratory – the passing condition is to obtain positive marks from all laboratory exercises to be planned during the semester.

Calculation of the final grade: lecture 50% + laboratory 50%

## Recommended reading

1. Graziani R., Johnson A.: CCNA2 Routing Protocols and Concepts: CCNA Exploration Companion Guide, Cisco Networking Academy, Indianapolis, Indiana, 2012.

2. Lewis W.: LAN Switching and Wireless: CCNA Exploration Companion Guide, Cisco Networking Academy, Indianapolis, Indiana, 2012.

3. Vachon B., Graziani R.: Accessing the WAN: CCNA Exploration Companion Guide CCNA Exploration Companion Guide, Cisco Networking Academy, Indianapolis, Indiana, 2012.

## Further reading

## Notes

Modified by dr hab. inż. Marcin Mrugalski, prof. UZ (last modification: 28-10-2019 22:41)