Designing computer networks - course description

General information

Course name	Designing computer networks
Course ID	11.3-WE-INFP-DesComNet-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Computer Science
Education profile	academic
Level of studies	Erasmus programme
Beginning semester	winter term 2017/2018

Course information

Semester	6
ECTS credits to win	5
Course type	optional
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	-	-	Credit with grade
Project	15	1	-	-	Credit with grade

Aim of the course

Student is able: configure 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: Subnetting 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. Defaultrouting. Fullclass 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, holddown timers and route poisoning methods. Load balancing in computer networks.

Network security: Standard and extended access control list configuration. Dynamic access controllist. Reflexive access control list. Contextbase 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.

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 choose the proper routing protocol necessary for the optimal functioning of the routing inside and between autonomous systems.		• an exam - oral, descriptive, test and other	• Lecture
Can creatively develop the division of IP address space into subnets using VLSM technique.		• a test with score scale	• Lecture
Can characterize and point out the differences between static and dynamic routing.		• a test with score scale	• Lecture
Can characterize routing protocols operating according to a distance vector and link state.		• a test with score scale	• Lecture

Outcome description	Outcome symbols	Methods of verification	The class form
Can use NAT and PAT translation techniques.		• an exam - oral, descriptive, test and other	• Lecture
Can implementclass and classless routing in computer networks.		• an exam - oral, descriptive, test and other	• 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 with score scale	• Lecture
Knows the structure and can carry out an advanced configuration process of routers and switches.		• an exam - oral, descriptive, test and other	• Lecture

Assignment conditions

Lecture – in order to get a credit it is necessary to pass all tests (oral or written) carried on at last once per semester.

Laboratory – in order to get a credit it is necessary to get positive grades for all laboratory works defined by the tutor

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: 05-07-2017 12:16)

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