COURSE DESCRIPTION CARD - SYLLABUS

Course name
Hardware Oriented Network Operating Systems [S1EiT1E>SSOPS]

Course

Field of study
Electronics and Telecommunications

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Student knows how to prepare simple program, student has at least medium knowdledge about computer networks (Ethernet, IP, routing protocols). Student also know how to use documents from Internet, software documentation and tutorials

Course objective

The goal is: To show to the students how network operating system works, demonstrate example of network operating systems in real network devices, their typical usage and discuss different scenarios, to get them familiar with typical and not typical problems, configurations and usage scenarios. To show them how procedure are realized in hardware, how protocols are implemented, how they are related with hardware features, how to configure and maintain network nodes, to discuss different case when network applications are used. To show security mechanisms, how to implement them and what is the risk without them (or with mistakes) To show risks which are hidden in inproper implementation, how to avoid them, how to test and verity network devices.

Course-related learning outcomes

Knowledge:

Has in-depth knowledge of the construction and operation of basic telecommunications systems
Has practical knowledge of security systems or methods for ensuring the security of information transmitted in computer networks and radiocommunications.
Has structured knowledge in the field of ICT networks and information-related operations
Has ordered practical knowledge of general IT networks or sound techniques or measuring and embedded systems

Skills:
Is able to obtain information from literature and databases as well as other sources in Polish or English; is able to integrate obtained information, interpret it, draw conclusions and justify opinions

Social competences:
Is aware of the need to expand their competences and is ready to cooperate as part of a team
He knows the limits of his own knowledge and skills, understands the need for further training

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture - oral or written exam, 50% to pass
Laboratories - oral or practical exam, 50% to pass

Programme content

Lecture:
Architecture and functions of networking operating system.
Hardware with typical and extended functionality of network operating systems
Hardware aspects of virtualization of network nodes and hosts
Virtualization of networks
Hardware realization of remote access - Virtual Private Networks;
Performance of network, bottlenecks" analysis
Mechanisms and protocols for communications between network systems;
Hardware realization of security mechanisms,
Hardware support of Software Defined Networks, hardware for OpenFlow;
Example of Network Operating System in hardware network devices (Alcatel-Lucent, Cisco, HP, Juniper Networks);
Demo of preparing own system with usage NetFPGA cards with interfaces 1Gbps and 10Gbps (hardware and software working together).
Hardware realization of network protocols (routing, switching)
During lectures and laboratories students will work on phsical Cisco, Huawei, Juniper network devices.
Laboratories:
Building and configuring networsk of nodes realized on Linux operatins system, Alcatel-Lucent, Cisco, Juniper and Huawei routers and L2/L3 switches; working with hardware network devices (in remote Data Center and local laboratory, running and analyzing demo of network prototype device and prepare simple own project

Course topics

none

Teaching methods

Lecture with presentations of real devices and cases; conversation lecture
Laboratories - practical laboratories with real devices

Bibliography

Basic
1. A. Tanenbaum, Computer Networks. Prentis Hall
2. W. Odom CCNP ROUTE , CCNP SITCH, Cisco Press
3. T. Adelstein, B. Lubanovic, Linux System Administration,O"Reilly Media

Additional
1. Z. F. Xu Designing and Implementing IP/MPLS-Based Ethernet Layer 2 VPN Services An Advanced Guide for VPLS and VLL, Wiley Publishing
2. D. Hanks, H. Reynolds, Juniper MX Series, O"Reilly Media
3. www: netfpga.pl, netfpga.org

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,00
Classes requiring direct contact with the teacher	55	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	35	1,00