



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Application oriented network operating systems

Course

Field of study

Electronics and Telecommunications

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

III/6

Profile of study

general academic

Course offered in

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

30

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

6

Lecturers

Responsible for the course/lecturer:

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Instytut Sieci Telekomunikacyjnych

Wydział Informatyki i Telekomunikacji

Responsible for the course/lecturer:

Prerequisites

Student knows how to prepare simple program, student has at least medium knowledge 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 services are realized, how protocols are implemented, 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)

Review of modern network devices with a wide spectrum of applications, presentation of issues related to the design and implementation of high-performance network nodes, launch of sample solutions.

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:

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

Basic and extended functionality of network operating systems

Software aspects of virtualization of network nodes and hosts

Virtualization of networks

Software realization of remote access - Virtual Private Networks;



Software realization of security mechanisms,

Mechanisms and protocols for communications between network systems;

Software Defined Networks and their protocols (OpenFlow, Network Controllers);

Example of Network Operating System on PC (Android, Linux, Windows);

Demo of preparing own system with usage NetFPGA cards with interfaces 1Gbps and 10Gbps (hardware and software working together).

Software realization of network protocols (routing, switching)

During lectures and laboratories students will work on virtual Cisco, Huawei, Juniper network devices.

Laboratories:

Building and configuring network of nodes realized on Linux operating system, Alcatel-Lucent, Cisco, Juniper and Huawei routers and L2/L3 switches; working with virtual machines (in remote Data Center), running demo of network services and prepare simple own ones

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 SWITCH, 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. Bauer Michael D., Linux - Servers Security, O'Reilly Media



Breakdown of average student's workload

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

¹ delete or add other activities as appropriate