POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Network operating systems [S1Teleinf1>SSO]

Course

Field of study	Year/Semester
Teleinformatics	4/7
Area of study (specialization)	Profile of study
–	general academic
Level of study	Course offered in
first-cycle	Polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other
30	15	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

3,00

Coordinators	Lecturers
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Prerequisites

A student starting this course should have knowledge of the basics of ICT networks and devices, should know the principles of the IP protocol and the basic mechanisms of routing protocols. He should also have basic programming skills. Should have the ability to obtain information from the indicated sources. He should also understand the need to expand his competences. In addition, in the field of social competences, the student must present attitudes such as honesty, responsibility, perseverance, cognitive curiosity, creativity, personal culture, respect for other people.

Course objective

The aim of the course is to show students the possibilities and principles of operation of modern network operating systems, their configuration and the services they offer.

Course-related learning outcomes

Knowledge:
Has a basic and structured knowledge of the construction, operation and performance evaluation of LAN, VLAN, WLAN and WAN networks as well as their standards and development directions
Has structured knowledge of the architecture of processors and network devices, configuration and

programming of network nodes, traffic management mechanisms, quality and reliability mechanisms, and network operating system drivers

Skills:
Can define the basic parameters and properties of signals and telecommunication systems, compare transmission media and methods of signal transmission and coding in various links, as well as design simple
wired and wireless networks, optimizing the operation of network devices under the imposed restrictions.
He can organize networks and supervise their work, and use technologies that enable safe data transmission in
ICT networks
He can solve common problems regarding the optimal design of a local network and the selection and configuration of network devices, taking into account their architecture and technical requirements, as well as
undertake the tasks of launching a local computer network
Can ensure the optimal flow of traffic in the ICT network and configure network devices using domain and inter-domain routing protocols
Can solve typical technical problems in the field of construction and operation of computer systems, operating
systems, basics of database management and computer networks, taking into account economic aspects

Social competences:
Is aware of the threats to the security of network systems and understands the need to use solutions supporting data protection
Is aware of the importance of decisions made and understands the social, economic and environmental consequences of an engineer's activity.

Methods for verifying learning outcomes and assessment criteria
Learning outcomes presented above are verified as follows:

In the field of the laboratory:
on the basis of the assessment of the current progress in the implementation of exercises and / or the final test
(carried out practically or orally), Passing the final test for 50% of the points obtained.
In the scope of the lecture:
On the basis of the final test carried out orally or in writing, Passing the final test for 50% of the points obtained

Programme content
LECTURES:
Architecture of a computer network node, hardware and software components
Functions and tasks of the network node, software implementing them.
Characteristics of traffic handling in a network processor, in a dedicated system. hardware, performance evaluation mechanisms and measurements.
Operation and basic and advanced network mechanisms on the example of Linux
Functionalities and capabilities of network processors.
Functionalities and possibilities of NetFPGA 1G and NetFPGA10G cards.
Software for dedicated hardware devices (e.g. NetFPGA card firmware, its driver in the OS).
Examples of SK nodes / devices implementation on the NetFPGA card.
Hardware layer communication with OS software.
Examples of configurations, ways of delivering the configuration, elements of its content.
Scripts, shell programs.
Elements of hardware and software virtualization and network functions.
Mechanisms of errors, gaps, lifting and ensuring security.
Programmability of computer networks
Methods, characteristics of remote access, mechanisms of auto-configuration.
Mechanisms of redundancy and security.
LABORATORY EXERCISES
Presentation of the plan of laboratory exercises. Getting to know the devices and the structure of the

laboratory network. Overview of the evaluation principles. Presentation of health and safety regulations.
Configuration of the laboratory network and workstations as its nodes
Mechanisms for ensuring and verifying local and remote access to devices
Programmability of computer networks
Traffic analysis and performance measurements in the Ethernet / IP network
Final test
Work on example nodes Juniper, Alcatel-Lucent, Cisco, Dell, Huawei
Use of NetFPGA1G and NetFPGA10G cards
Implementation of the network switch and network card on the NetFPGA card
Implementation of the network performance analyzer on the NetFPGA card
Configuration of selected services on Alcatel-Lucent routers and in the Linux system
Configuration of selected services on Juniper Networks routers and switches

Course topics

Teaching methods

Conversational lecture, multimedia presentation, supplemented with current examples, web links to resources
on the Internet,
laboratory exercises: launching sample solutions in the network in the laboratory, analysis of their configuration

Bibliography

Basic:
Internet
A. Tanenbaum, Computer Networks. Prentis Hall
W. Odom CCNP ROUTE , CCNP SITCH, Cisco Press
T. Adelstein, B. Lubanovic, Linux System Administration,O'Reilly
Z. F. Xu Designing and Implementing IP/MPLS-Based Ethernet Layer 2 VPN Services An Advanced
Guide for VPLS and VLL, Wiley Publishing
D. Hanks, H. Reynolds, Juniper MX Series, O'Reilly Media

Additional:
Bauer Michael D., Linux - Bezpieczeństwo serwerów, O'Reilly Media

Breakdown of average student's workload

	Hours	ECTS
Total workload	86	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	41	1,00