STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Network Operating Systems**		Code **1010822121010822433**
Field of study **Electronics and Telecommunications**	Profile of study (general academic, practical) **general academic**	Year /Semester **1 / 2**
Elective path/specialty **Computer Networks and Internet**	Subject offered in: **Polish**	Course (compulsory, elective) **elective**

Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**

No. of hours Lecture: **2** Classes: **1** Laboratory: **1** Project/seminars: **-**	No. of credits **5**

Status of the course in the study program (Basic, major, other) **other**	(university-wide, from another field) **from field**

Education areas and fields of science and art
 	
technical sciences
      Technical sciences
	ECTS distribution (number and %**)**
	
	5 100%
	    5 100%

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	She/hehas deep knowledge in terms of architecture and functionality telecommunication systems (K2_W01)
		She/hehas proactical knowledge in terms of security (K2_W13)
		She/hehas knowedge and experience in terms of rules and network mechanisms (K2_W13)
		She/hehas practical experience in terms of designing teleinformatic networks (K2_W14)
2	**Skills**	She/he can take the information from the literature and databases and other sources in Polish or English; she/he is able to integrate the information, make their interpretation, draw conclusions and justify opinions [K1_U01]. She/he can communicate in English or Polish in workplace and in other environments [K1_U02].
3	**Social competencies**	She/he knows the limits of their own knowledge and skills, understands the need for lifelong education [K1_K01].

Assumptions and objectives of the course:

To get familiar students with functions and capabilities of operating systems working on actual network devices, practical usage of kowdlege (in real networks and in the laboratories), review of nowadays networking devices, preparation own example of network device

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. - [K2_W11]
2. - [K2_W12]

Skills:

1. - [K2_U01]

Social competencies:

1. - [K2_K02]
2. - [K2_K04]

Assessment methods of study outcomes

Lectures
 - exam (writen)

Excercises and Laboratories
 - continous verification of knowledge (during classes)
 - practical test of knowledge and experience

Course description

Lectures:
1.   Architecture and functions of networking operating system
2.   Virtualization of network nodes and hosts
3.   Virtualization of networks
4.   Mechanisms for databases;
5.   Remote access - VPN;
6.   Security mechanisms, performance of network
7.   Mechanisms and protocols for communications between network systems;
8.   New protocols (OpenFlow);
9.   Example of Network Operating System (Cisco, Alcatel-Lucent, Juniper Networks);
10.   Demo of preparing own system with usage NetFPGA cards with interfaces 1Gbps and 10Gbps.

Basic bibliography:

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 bibliography:

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 - Bezpieczeństwo serwerów, O'Reilly Media

Result of average student's workload

Activity	Time (working hours)
1. Lectures	30
2. Excercises	15
3. Laboratories	15
4. Preparation for excercises	30
5. Preparation for laboratories	30
6. Preapration for lectures	15
7. Preparation for exam	10
8. Exam	2
9. Analysis of exam results	2

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	65	2
Practical activities	65	2