COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer network devices

Course

Field of study
Electronics and telecommunications

Year/Semester
3/6

Area of study (specialization)
Computer networks and Internet technologies

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
dr hab. inż. Mariusz Żal,
mariusz.zal@put.poznan.pl

Responsible for the course/lecturer:

Prerequisites

Students have a basic knowledge of computer networks, network protocols and communication networks; Has a basic knowledge of C++/C programming languages. Students are able to find information in literature, as well as other reference sources; is able to integrate and interpret obtained information, draws conclusions and justifies. Student understands a necessity to acquire a new knowledge and skills stemming from a chosen field of studies.

Course objective

To acquaint students with functions of computer network devices located in particular layers of TCP/IP and OSI references models. Presentation of architecture of network devices such as routers, switches, devices acting in ADSL, passive optical networks. To acquaint students with access network standards. Presentation of network processors and NetFPGA architectures and implementations.

Course-related learning outcomes

Knowledge

1. Student has a systematic and well-founded knowledge of computer architectures.
2. Student knows mobile devices hardware profile and knows how to implement required functionality.

3. Student has basic knowledge of standards, architecture, network protocols and operation of computer networks.
4. Student has basic knowledge of LINUX drivers.
5. Student has a systematic and well-founded knowledge of development network devices using network processors and FPGA.

Skills

1. Is able to evaluate and to choose communication devices that satisfy technical requirements.
2. Is able to configure network devices and hosts and run local computer network.
3. Is able to develop a simple character driver or network interface card driver.
4. Is able to use bibliography in English (books, scientific and technical journals, application notes, catalogs, instructions, recommendations etc.).

Social competences

1. Demonstrates responsibility for designed software. Is aware of the hazards they pose for individuals and communities if they are improperly designed.
2. A student is able to formulate opinions concerning challenges of contemporary networks application programming.
3. A student is aware of the impact of network application on the information society.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes are verified with a written or oral test. Test in written form consists 7-10 question (multichoice and open), which are scored in different ways (there are three or four groups of scores). Test in oral form contains 50-60 open questions divided into three or four score groups. Students draw one question from each group. In the oral form, for each question teacher can ask one additional question. Both, main and additional questions are scored, taking into account content range and understanding the issue. Minimum number of scores to pass the exam is equal to 50%.

Knowledge and skills gathered during tutorials are assessed by project realized on the last classes. The project contains 5 – 6 tasks which are scored in different ways. Each task can be realized independently. Minimum number of scores to pass the exam is equal to 50%.

The assessment levels (lecture and tutorials) are the following:

Number of scores	mark
<=50 %	2,0
51% - 60%	3,0
61% - 70%	3,5
71% - 80%	4,0
81% - 90%	4,5
91% - 100%	5,0

Programme content

Lectures:
1. OSI RM and TCP/IP reference models, classification of computer network elements and devices
2. Router architecture, data forwarding, data queuing
3. Router functions: routing tables, path searching, operating systems, memories
4. Routers market review
5. L2 switches architectures and functionality
6. Access networks – ADSL and VDSL standards and devices
7. Powering network devices – POE standards
8. Passive optical networks: EPON, GEPON, GPON, XG-PON, NG-PON2, XGS-PON
9. Architectures of OLT and ONU
10. Drivers for network interface cards
11. Network processors – architectures and functionality, EZchip processors
12. Programmable network devices, NetFPGA cards
13. Network processors programming

Tutorials:
1. Simple character drivers in LINUX
2. Network interface card drivers in LINUX
3. Network processor applications: ping, traceroute
4. Network processor applications: router
5. Traffic scheduling in EPON networks
6. Data searching algorithms
7. Data structures in xCAM memories

Teaching methods

1. Lectures:
a) multimedia presentations illustrated with examples presented on the board.
b) practical case study of selected events in database management systems or programming languages runtime environment.

2. Laboratory classes : solving problems given by the teacher (practical case study with networks processors, NetFPGA or LINUX systems) complemented with multimedia presentations.

Bibliography

Basic

1. Wojciech Kabaciński, Mariusz Żal, Sieci telekomunikacyjne, WKŁ 2008
2. Rubini A., Linux - sterowniki urządzeń : system operacyjny kompatybilny z Uniksem (oprac. wersji pol. Krzysztof Łabanowski), Wydawnictwo RM, 1999

Additional

1. Ran Giladi, Network Processors, Morgan Kaufmann 2008,
2. Ethernet Passive Optical Networks Glen Kramer, McGraw-Hill 2005

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	31	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	44	1,0

[1] delete or add other activities as appropriate