POLITECHNIKA POZNAŃSKA
Wydział Informatyki i Telekomunikacji
ul. Piotrowo 3, 60-965 Poznań
tel. 61 665 34 20, fax 61 665 34 21

STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Computer networks I		**1010511341010510261**
Field of study: **Computing**	Profile of study (general academic, practical): **General academic**	Year /Semester: **2 / 4**
Elective path/specialty: **-**	Subject offered in: **Polish**	Course (compulsory, elective): **compulsory**
Cycle of study: **First-cycle studies**	**Form of study** (full-time,part-time): **full-time**	
No. of hours: Lecture: **30** Classes: **-** Laboratory: **30** Project/seminars: **-**		No. of credits: **4**
Status of the course in the study program (Basic, major, other): **major**	(university-wide, from another field): **from field**	
Education areas and fields of science and art: **technical sciences**, **Technical sciences**		**ECTS distribution (number and %)**: **4 100%**, **4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge:**	Student starting this module should have basic knowledge regarding computer systems organization, algorithms and data structures, and operating systems
2	**Skills:**	He/she should have skills allowing formulation of algorithms and their programming with the use of at least one widely used software tool. He/she should have skills that are necessary to acquire information from given sources of information. Student should understand the need to extend his/her competences and should express cooperativeness in a team.
3	**Social competencies**	In addition, in respect to the social skills the student should show attitudes as honesty, responsibility, perseverance, curiosity, creativity, manners, and respect for other people

Assumptions and objectives of the course:

1. Provide students' knowledge regarding computer networks, within the scope of using, configuration, design and programming of local area and wide area networks, and cognition of technical solutions applied in these networks.
2. Develop students' skills in solving simple problems related to the use and configuration of computer networks.
3. Develop students' skills in team work, especially in configuration, design, and programming of technical solutions applied in computer networks.

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

Knowledge:

1. Student have well-ordered, theoretically based general knowledge on networking technologies
2. Student have knowledge on important directions of computing science, and other related fields of science, especially electronics, telecommunications, and automatics and robotics
3. Student have basic knowlegle about cycle of life of computing science systems, both hardware and software ones, and especially on processes occuring in them
4. Student knows basic techiques, methods and tools used in a process of solving of computing science tasks, mainly engineering ones, from the field of key issues in computing science

Skills:

1. Student is able to perform the critical analysis of the way of functioning of computing systems and other computing technical solutions an evaluate these solutions, especially: is able to participate in the software inspection and evaluate software architecture from the point of view of non-functional requirements, and is able to systematic performing of functional tests

2. Student is able - according to given specification - to design connection schema, connect and configureselected items of computer network, using appropriate methods, techniques and tools

3. Student is able to secure data against unauthorized access

4. Student is able to organize, cooperate, and work in a team, accepting various roles in it, and is able to define accordingly the priorities used to the implementation of given task from the area of computer networks

Social competencies:

1. Student understands that in computing science both knowledge and skills very quickly become out-of-date -

2. Student is aware of the meaning of knowledge in solving engineering problems and knows the examples and understands the reasons of malfunctioning computing systems, which led to serious financial and social losses or to the serious loss of health, or even life

Assessment methods of study outcomes

Formative assessment:

a) lectures:

based on answers to questions on previous lectures,

b) laboratory classes:

evaluation of doing correctly assigned tasks,

Total assessment:

a) verification of assumed learning objectives related to lectures:

i. based on the sum of answers and the activity during lectures.

ii. evaluation of student's knowledge and skills obtained in lectures based on written test, covering from 3 to 5 questions, or from 10 to 15 test questions. In order to obtain positive note, the student should obtain 50% of maximum number of points. During the test, student cannot use any lecture notes, books, etc.

b) verification of assumed learning objectives related to laboratory classes:

i. evaluation of student's skills related to carrying out the lab tasks and configuration task,

ii. monitoring student's continuing activities during classes,

iii. evaluation of student's skills based on one or two tests, covering from 10 to 15 questions.

Course description

The lecture should cover the following topics

1) Fundamentals of computer networks (historical note, motivation, required properties of a network, network architecture: OSI and TCP/IP, network topologies, network types, network devices, standards).

2) Network access technologies (functions of network interface card: encoding, framing, error detection, reliable transmission, link access methods), local area networks (CSMA/CD - Ethernet, Token Ring - FDDI, CSMA/CA -wireless networks).

3) Delivery, forwarding and routing (packet switching, forwarding, routing, routing algorithms, RIP and OSPF protocols, cell switching - ATM, switching devices).

4) Internetworking (IPv4 protocol, IPv6 protocol, multicast, domain name system - DNS).

5) Communication protocols (creation, objective, standards, protocol engineering)

6) Internet (structure, addressing, transport protocols: UDP, TCP, standards, applications).

The lab-classes should cover the following topics:

1) The layered model and architecture of a computer network,

2) IPv4 addressing - basics,

3) Advanced IPv4 addressing,

4) Diagnostics of problems in the physical layer,

5) data link layer and ARP protocol

6) Ethernet technology network devices,

7) IP protocol, ICMP, DHCP,

8) static route selection in Linux,

9) basic configuration of Cisco routers,

10) dynamic route selection in Cisco routers

11) VLANs networks

12) packet filtering in Linux

13) network address translation in Linux

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Teaching methods

Lectures: multimedia presentation, presentation illustrated with examples presented on blackboard.

Labs: solving tasks, practical exercises with use of network devices, discussion, teamwork, multimediashowcase, configuration task verified during laboratory classes.

Basic bibliography:

1. TCP/IP Protocol Suite, 4th edition, B.A. Forouzan, McGraw-Hill Education, New York, 2009
2. Data Communications and Networking, 5th edition, B.A. Forouzan, McGraw-Hill Education, New York 2012
3. Sieci komputerowe, Wydanie V, A.S. Tanenbaum, D.J. Wetherall, Helion, Gliwice, 2012
4. Sieci komputerowe. Podejście systemowe, L.L. Peterson, B.S. Davie, Nakom, Poznań, 2001
5. Sieci komputerowe. Ujęcie całościowe, Wydanie V, J.F. Kurose, K.W. Ross, Helion, Gliwice 2010

Additional bibliography:

1. Vademecum teleinformatyka I, praca zbiorowa, IDG, Warszawa, 1999
2. Vademecum teleinformatyka II, praca zbiorowa, IDG, Warszawa, 2003
3. Vademecum teleinformatyka III, praca zbiorowa, IDG, Warszawa, 2004
4. Diagnozowanie i utrzymywanie sieci. Księga eksperta, J. Scott Haugdahl, Helion, Gliwice, 2000

Result of average student's workload

Activity	Time (working hours)
1. participation in laboratory classes:	30
2. preparation for laboratory exercises:	14
3. participation in consultations related to the realization of the educational process, in particular exercises laboratory classes / project	2
4. preparation for tests / colloquium	15
5. participation in lectures	30
6. reading the indicated literature / teaching materials (10 pages of scientific text = 1 hour), 100 pages	10

Student's workload

Source of workload	hours	ECTS
Total workload	101	4
Contact hours	62	2
Practical activities	61	2