COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer networks 1 [N1Inf1>SK1]

Course

Field of study
Computing

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
16

Laboratory classes
16

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

dr inż. Tomasz Bilski
tomasz.bilski@put.poznan.pl

Lecturers

Prerequisites

Knowledge: Student starting this module should have basic knowledge regarding computer systems organization, algorithms and data structures, and operating systems. 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. 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.

Course objective

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.

Course-related learning outcomes

Knowledge:
1. have well-ordered, theoretically based general knowledge on networking technologies - [K1_W4]
2. have knowledge on important directions of computing science, and other related fields of science, especially electronics, telecommunications, and automatics and robotics - [K1_W5]
3. have basic knowlegle about cycle of life of computing science systems, both hardware and software ones, and especially on processes occuring in them - [K1_W6]
4. 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 - [K1_W7]

Skills:
1. 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 th point of view of non-functional requirements, and is able to systematic performing of functional tests - [K1_U9]
2. is able - according to given specification - to design connection schema, connect and configure selected items of computer network, using appropriate methods, techniques and tools - [K1_U10]
3. is able to secure data against unauthorized access - [K1_U12]
4. 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 - [K1_U18]

Social competences:
1. understands that in computing science both knowledge and skills very quickly become out-of-date - [K1_K1]
2. 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 - [K1_K2]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Formative assessment:
a) lectures:
- student activity assessment,
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 exam with open questions. In order to obtain positive note, the
student should obtain more than 50% of maximum number of points. During the exam, 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.

Programme content

The lecture should cover the following topics
1) Fundamentals of computer networks (historical note, required properties of communication channel, 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, CSMA/CA - wireless networks).
3) Delivery, forwarding and routing (packet switching, forwarding, routing, routing algorithms, RIP and OSPF protocols).
4) Internetworking (IPv4 protocol, IPv6 protocol, multicast, domain name system - DNS).

5) Communication protocols (creation, objective, standards)
6) Internet (structure, addressing, transport protocols: UDP, TCP, standards, applications).
The lab-classes should cover the following topics:
1) IPv4 addressing,
2) Advanced IPv4 addressing
3) Layered model and network architecture
4) Basics of structured cabling
5) Communications programming using serial port
6) Networking devices in Ethernet technology
7) ARP Protocol
8) Configuration of Linux network
9) Static routing in Linux networks
10) Static routing in Cisco routers
11) Dynamic routing in Cisco routers
12) Packet filtration in Linux networks
13) Network address translation in Linux networks

Teaching methods

Lectures: multimedia presentation, presentation illustrated with examples presented on blackboard, elearning
Labs: solving tasks, practical exercises with use of network devices, discussion, teamwork, multimedia showcase, configuration task verified during laboratory classes.

Bibliography

Basic
1. Computer Networks, Comer
2. Computer Networks, 5th edition, A.S. Tanenbaum, D.J. Wetherall, Pearson, Boston, 2011
3. Computer Networking: A Top-Down Approach, 7th edition, J.F. Kurose, K.W. Ross, Pearson Education, Boston, 2016
4. Computer Networks: A Systems Approach, L.L. Peterson, B.S. Davie, 5th edition, Morgan Kauffmann, San Francisco, 2012

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	32	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	68	2,50