COURSE DESCRIPTION CARD - SYLLABUS

Course name
Introduction to computer networks [S1MiKC1E>WdSK]

Course

Field of study
Microelectronics and Digital Communication

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

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Prerequisites

The student starting this course should have a basic knowledge of the structure and operation of a computer and should know the binary and decimal number representation system. Should have the ability to convert decimal numbers to binary and vice versa, be able to obtain knowledge from indicated sources and be ready to cooperate as part of the team.

Course objective

The aim of the course is to provide students with basic knowledge of the mechanisms used in computer networks, with particular emphasis on protocols and services used on the Internet. Developing students' skills in solving problems arising in the process of configuring network device parameters.

Course-related learning outcomes

Knowledge:
1. Has a systematic basic knowledge of the structure, operation and standards of computer networks.

2. Has knowledge of the use and configuration of basic devices used in computer networks.
3. Knows the terms characterizing computer networks and understands the technical meaning of these terms.

Skills:
1. Is able to use network diagnostic tools available in the computer operating system.
2. Is able to configure network devices in terms of basic network services.
3. Can correctly use concepts related to computer networks.

Social competences:
1. Is aware of the need for a professional approach to solving technical problems and taking responsibility for the technical solutions he proposes.
2. Understands the impact of own work on the team's results and the need to comply with the principles of teamwork and take responsibility for jointly performed tasks.
3. Knows the limitations of his own knowledge and skills, understands the need for further education.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge gained from lectures is assessed through a final assessmentm, in the form of a multiple-choice test, containing at least 40 questions covering the issues discussed during the lectures. Questions can be scored differently depending on the number of correct answers. Exam completion threshold: 50% of points (dst grade). The grading scale complies with the percentage division, i.e. from 60% of points - dst plus grade, 70% of points - db grade, etc. As a help in preparing for the exam, students receive a set of slides presented during lectures and a set of issues facilitating preparation for the exam.
Laboratory exercises: based on at least czterech short (approx. 10-minute) quizzes written at the beginning of the classes, a final colloquium, and reports. The final grade is calculated as the arithmetic mean of the grades obtained from the tests and the final colloquium. Points collected on the quizzes are added together, and the grade is calculated according to the study regulations (50% of points are graded dst, 60% are graded dst+, etc.). For the final colloquium, the assignment of grades to percentage ranges in accordance with the study regulations also applies. Because the quizzes (equivalent to laboratory entry tests) are adapted to students' current knowledge, it is not possible to make up these tests at later dates.
A prerequisite for passing the course is the submission and approval of all laboratory reports by the teacher before the final colloquium. Failure to pass even one report will prevent the student from receiving a credit for the course.
Students are required to pass all laboratory exercises. The teacher assesses the course by verifying the correct completion of the exercise, for example, by checking the correct configuration of network devices, asking questions about the exercise, and passing the report. Failure to pass an exercise will result in the exercise being repeated within a deadline specified by the instructor. Each student is required to upload a report from the exercise to the eKursy platform by a deadline specified by the teacher, before proceeding to the next exercise. At the student's request, justified by illness or unexpected events, the report submission deadline may be extended. Only reports uploaded to the eKursy platform will be considered for credit; reports submitted via email will not be assessed. Failure to submit reports to the eKursy system by the deadlines without a clear reason, or re-uploading a rejected report without making the corrections requested by the teacher, will result in failure to pass the exercise. A single correction to the report is permitted without further consequences.
It is the student's responsibility to familiarize themselves with the scope of the exercise being performed in advance. The knowledge required to properly complete the exercise may be verified by the teacher at the beginning of the class. Failure to verify the correctness of the assessment may result in the student being excluded from the class, which will result in failing the exercise. Students are required to have knowledge of previously completed exercises and the prerequisites specified for each exercise.

Programme content

The course covers the following topics: computer network components, packet switching, network layer models, MAC and IP addresses, network equipment, protocols: IP, TCP and UDP, router configuration commands.

Course topics

Lecture:
1. Organizational issues related to the course: course program, rules for passing classes and literature. Basic concepts and components of computer networks. Development of ICT networks and network mechanisms.
2. Layered protocol systems: OSI and TCP/IP model.
3. MAC and IPv4 addresses. Transmission of frames and packets over the IP network. Domain addresses, DNS. Delay, packet loss, throughput in packet-switched networks. ICMP protocol.
4. Access networks, Ethernet standard. Structured cabling system: standards, elements, transmission media.
5. Basic functions of network devices (regenerators, bridges, switches, routers).
6. Analysis of protocols: IP, TCP and UDP, with particular emphasis on the content of packet headers of each protocol.
Laboratory:
1. Basics of IP addressing. Network and broadcast addresses, host addresses. Subnetting.
2. Network tools available in the operating system.
3. Analysis of network protocols (Wireshark).
4. Basic applications and functionality of network devices (CPT).
5. Commands for configuring routers, configuring routers and checking the correctness of the configuration.
6. Repeating exercises that have not been passed.

Teaching methods

Lecture: conventional with the use of multimedia presentation available for students; additional examples are provided on the blackboard.
Laboratory exercises: the introduction to selected exercises is carried out by means of a multimedia presentation and examples provided on the blackboard. Each of the exercises has an instruction, according to which students carry out individual exercises. The instructions also contain additional questions related to the study topics.

Bibliography

Basic:
1. J. Kleban, Introduction to computer networks - slides for lectures
2. J.F. Kurose, K.W. Ross: Sieci komputerowe. Ujęcie całościowe, Wydanie VII, Helion, Gliwice, 2017
3. A.S. Tannenbaum, D.J. Wetherall: Sieci komputerowe, Helion, Gliwice, 2012

Additional:
1. K. Nowicki, J. Woźniak: Sieci LAN, MAN i WAN - protokoły komunikacyjne, Wydawnictwo Fundacji Postępu Telekomunikacji, Kraków, 2001
2. R. Pawlak, Okablowanie strukturalne sieci. Teoria i praktyka, Wydanie III, Helion, Gliwice, 2011.
3. Akademia sieci Cisco: Cisco Systems, INC.: autoryzowany podręcznik programu Cisco Networking Academy, red. Vito Amato; współpr. Wayne Lewis ; przekł. z jęz. ang. Wiesława Jachymczyk, Krzysztof Turczyński.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00