



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Fundamentals of ICT Network [S1Teleinf1>PST]

Course

Field of study
Teleinformatics

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

dr inż. Janusz Kleban
janusz.kleban@put.poznan.pl

Lecturers

dr inż. Janusz Kleban
janusz.kleban@put.poznan.pl
dr inż. Paweł Pirosz
pawel.pirosz@put.poznan.pl

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

Course objective: provide students with basic knowledge about protocols and devices used in ICT networks. To familiarize students with selected concepts and network technologies, in particular with hardware solutions, the knowledge of which is necessary for the further study of advanced issues. Developing students' skills in solving problems appearing in the process of configuring the parameters of network devices.

Course-related learning outcomes

Knowledge

1. Has a systematic and theoretically founded knowledge on the construction and operation of ICT networks.
2. Has knowledge of the configuration and operation of basic devices used in ICT networks.
3. Knows the terms characterizing ICT networks and understands the technical meaning of these terms.

Skills

1. Can properly use the concepts of ICT networks.
2. Can configure network devices and run local computer network. Can configure routing in WAN networks.
3. Can use the diagnostic tools available in the computer's operating system.

Social competences

1. Understands the impact of own work on the results of the team, respects the rules of working in a team and is responsible for jointly performed tasks.
2. Notices changes resulting from technological progress and understands the need to learn about new standards of ICT networks

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: written exam 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: on the basis of at least seven short (approx. 10 min.) tests, final test and reports. Passing threshold: 50% of the points obtained from all tests. It is also required to pass the reports from all exercises. The final test must be written by students who have not obtained enough points to pass the subject, or students who want to improve the proposed grade. Due to the fact that the tests are adapted to the current knowledge of students, it is not possible to correct the tests at later dates. In case of lack of a sufficient number of points, the final test allows obtain a pass. Students are required to complete all laboratory exercises. Passing is done by the teacher by checking the correctness of the exercise, e.g. by checking the correctness of network devices configuration and asking questions about the exercise being carried out. Failure to pass the exercise results in the necessity to repeat it on the date indicated by the teacher. Each student is required to upload a report on each exercise to the eKursy platform. Reports are subject to credit. Failure to pass even one report makes it impossible to obtain a credit for the course. Re-uploading the rejected report to the system, without making any corrections indicated by the teacher, will result in a reduction of the pool of points obtained by 3 points. Each report uploaded to the system after the date specified by the teacher will reduce the pool of points by 3 points.

Programme content

The course covers the following issues: network layered models, local area networks, network equipment, protocols: IP, TCP and UDP, IP addressing, routers configuration, basics of routing protocols, prospects for the development of the Future Internet.

Course topics

Lecture: The concept and tasks of ICT networks. Network classification. Development of ICT networks and network mechanisms. Characteristics of the OSI and TCP/IP models. Model IEEE802. Local network topologies. Functional characteristics of LLC and MAC layers. Operation of the LLC layer. Overview of protocols used in the MAC layer. Structured cabling: standards, elements, and transmission media. Functions performed by the IP, TCP and UDP protocols. Analysis of the content of packet headers generated by individual protocols. Network addressing. Static and dynamic routing. Classification of routing protocols. General characteristics of selected routing protocols. Discussion of the assumptions of the Future Internet with particular emphasis on the Internet of Things. Architecture of the Future Internet.

Laboratory: Basics of IP addressing. Network tools available in the operating system. Commands for

configuring the routers, configuring the routers and validating the configuration. Planning IP addressing and configuring routers according to the proposed addressing. Basics of routing. RIP protocol and routing table. Checking RIP parameters. Networks subnetting into subnets using a variable mask. Configuring the routers according to the prepared addressing scheme. Static routing.

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, Slides for lectures on the subject: Fundamentals of ICT networks
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 | 90 | 4,00 |
| Classes requiring direct contact with the teacher | 49 | 3,00 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 41 | 1,00 |