

SYLLABUS

Name: Computer networks (MakAu>SI5CN18)

Name in Polish:

Name in English: Computer networks

Information on course:

Course offered by department: Faculty of Automatic Control, Electronics and Computer Science

Course for department: Silesian University of Technology

Default type of course examination report:

EGZ

Language:

English

Course homepage:

<https://platforma.polsl.pl/rau1/course/view.php?id=1193>

Short description:

The course aims are related to education in the areas of computer network technologies, Internet techniques and communication technologies. The course aims objectives include having the students got acquainted with hardware and software solutions in computer networks, benefits from computer networks based communication, usage and administration of network operating systems and network programming.

Description:

ECTS: 6

Total workload: 150 hours (75 contact hours, 75 students' own work hours)

Forms of contact hours:

Lecture 30h

Laboratory 30h

Other 15h (tests and reports revision and discussion)

Students' own work: preparation for classes, elaboration of laboratory exercises results, preparation for tests

Lectures:

Overall objectives of the course include providing students with basic as well as advanced knowledge concerning components of computer network: communication methods, server computers, client computers, network infrastructure. Types of services offered by computer network servers are covered in detail as part of the course. Internet services, Internet and TCP/IP protocol suite, TCP/IP protocol structure, physical, data, network, transport and application layers tasks in computer network are also considered.

Specific topics covered during course lectures and laboratory exercises include the following: computer networks types and systems; local area network LAN and wide area network WAN; packets, frames, reliable and unreliable transmission; LAN cabling systems, physical topology, interfaces; Internet and TCP/IP protocol suite; network servers and types of services; Internet network protocol, TCP/IP protocol family. TCP/IP protocol structure, tasks and services concerning the physical layer, data layer, network layer, transport and application layers in computer network; DNS system and its role in naming hosts in computer networks; WAN techniques, routing and tracing routes; internetworks, architecture and protocols; basic applications of computer networks services; using electronic mail systems; www pages and browsers; advanced elements of UNIX/Linux operating system using; multimedia networking applications; streaming audio and video with networks; quality of Internet services – differentiated and aggregated services models; security in computer networks; cryptography, authentication, certification, firewalls; Internet commerce; computer network management.

Laboratory:

1. UNIX/Linux operating system basics.
2. Bash shell programming.
3. IP addressing and configuration.
4. System configuration, graphical and command line.
5. DNS & DHCP protocol, DNS server configuration.
6. Security issues, firewall configuration.
7. Client/server programming.
8. Client/server programming applications.
9. Simple www server programming and configuration.
10. PHP programming, Internet-based databases.
11. Network discovery, security auditing and vulnerability scanning.
12. Internet of Things.

Bibliography:

1. Douglas E. Comer, Computer Networks and Internets with Internet Applications, 6th Edition, Pearson, 2014, ISBN 10: 0133587932 ISBN 13: 9780133587937.
2. Andrew Stuart Tanenbaum, Computer Networks, 6th Edition, Pearson, 2021, ISBN-13: 9780137523214.
3. William Stallings, Data and Computer Communication, 10th Edition, Pearson, 2021, ISBN-13: 9780137561704.
4. James F. Kurose, Keith W. Ross, Computer Networking: A Top-Down Approach, 8th Edition, Helion, 2020, ISBN-13: 9780135928615.

Learning outcomes:

- Knowledge: Knows and understands
 - Knows rules for designing and building computer networks and benefits from establishing communication between computer systems (K1A_W10)
 - Knows basic models, protocols and specification used for creating computer networks, analysing computer network traffic, ensuring necessary quality of computer network services and security of network functioning (K1A_W10)
 - Knows how to design and implement Internet systems for enhancing education and engineering design, by means of efficient Internet technologies and services (K1A_W10)

- Skills: Can
 - Can administer computer network system to basic extent, by means of using standard software tools and programming languages for network systems administration (K1A_U23)
 - Can design and implement software for establishing basic communication between computer network devices and running network servers (K1A_U27)
 - Can use basic script programming languages and network database systems for configuring and running computer network servers and network services (K1A_U22)

Assessment methods and assessment criteria:

CN (Computer Networks) course consists of two components: lecture and laboratory exercises. According to SUT regulation, lecture attendance is optional, whereas participation in all scheduled laboratory exercises is obligatory.

There are 2 obligatory short tests during semester (at the lectures or clearly announced during lectures), graded from 0.0 to 5.0, it is necessary to get at least 2.5 from each test. Every test may be re-taken once at the end of semester. Lecture grade is calculated as average from 2 tests grades.

Laboratory exercises will be organized according to the schedule available on the course page, with details concerning date-time/exercise/tutor for all sections in groups. Every laboratory exercise is graded on the basis of students' work during laboratory exercise and report preparation as follows: 2 or from 3.0 to 5.0.

Every student has to attend all 12 laboratory exercises and get at least 3.0 grade from at least 11 lab exercises, upon these conditions the final laboratory grade is calculated as average from all 12 laboratory exercises grades, if such average is less than 3.0 the final laboratory grade is set to 2. Re-taking lab exercises is possible only on the dates specified for this purpose in the laboratory schedule.

Every student has to attend final exam at the end of semester. The exam consists of 5-10 problem questions that have to be answered by students in writing and delivered according to technical rules that will be available in detail for every exam sitting. The exam is graded as follows: 2 - fail, from 3.0 to 5.0 - pass. The exam may be re-taken twice during the exam session at the end of semester.

Final course grade (FCG) is calculated as follows, upon the condition that all component grades are at least 2.50:

$FCG = 0.5 * \text{exam grade} + 0.35 * \text{final laboratory grade} + 0.15 * \text{lecture grade}$,
rounded to the university grading scale,

otherwise the FCG is set to 2 - fail.

The syllabus is valid from academic year 2025/2026 and its content cannot be changed during the semester.

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	6	2020/2021-Z	