



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Computer Networks

Course

Field of study

Bioinformatics

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/ 5

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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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. knows the selected topics considering networking technologies - [K1_W10]
2. has the basic knowledge dealing with life cycle of computing systems - [K1_W12]

Skills

1. designs and creates computer software according to given specification, using appropriate methods, technics and tools - [K1_U07]
2. is able to prepare, in Polish or English, well documented report and oral presentation dealing with topics from the area of computer networks - [K1_U09]
3. is able to perform the functionality analysis and requirements analysis of computing systems - [K1_U12]

Social competences

1. understands the need of self-learning all the life and improving the competences - [K1_K01]
2. is able to cooperate and work in a team, accepting various roles - [K1_K02]
3. is able to define the priorities used for the implementation of the task defined by himself or others - [K1_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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,

iv. the final note of a student obtained during laboratory class is a weighted average from configuration task (1/2) and final test (1/2).

Programme content

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).
- 7) Transport protocols (simple demultiplexer - UDP, reliable data stream - TCP, remote procedure call - RPC, SunRPC, transport protocol efficiency, and SCTP Protocol).
- 8) Wide area computer networks (WAN technology, WAN devices, physical layer and data link layer, examples of WANs: X25, frame relay, ISDN, ATM, Gigabit Ethernet).

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.

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

Bibliography

Basic

1. TCP/IP Protocol Suite, 4th edition, B.A. Forouzan, McGraw-Hill Education, New York, 2009
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 Kaufmann, San Francisco, 2012

Additional

1. Network Analysis and Troubleshooting, J. Scott Haugdahl, Addison-Wesley, 1999



Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	60	2,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, configuration task preparation) ¹	40	1,5

¹ delete or add other activities as appropriate