

Course name: <b>Foundations of computer networks</b>		
Field of study: <b>Computer science</b>	Type of study: <b>Full time</b>	Course code: <b>B3_08</b>
Course characteristics: <b>Mandatory within the additional content</b>	Level: <b>First (Eng.)</b>	Year: <b>II</b> Semester: <b>III</b>
Type of classes: <b>lectures, laboratories</b>	Hours per week: <b>2 lect<sup>E</sup>, 2 lab</b>	ECTS points: <b>4 ECTS</b>

## COURSE GUIDE

### AIMS

- A1. Acquainting the student with general problems of communication in computer networks
- A2. Acquainting the student with principles of operation of computer networks.
- A2. Acquainting the student with various standards of computer networks.
- A3. Obtaining by the students the basic practical of skills in the use of network devices and selected elements of network operating systems.

### PREREQUISITES

1. The basic knowledge in the field of the electrotechnics and electronics.
2. The knowledge of basic terms of the computer science.
3. The skills of use various standard positional numeral systems.
4. The skills of working alone and in the group.
5. The skills of correct interpretation and presentation of own activity.

### LEARNING OUTCOMES

- EE 1 – Students will possess knowledge about computer network operation.
- EE 2 – Students will know the common neural network standards.
- EE 3 – Students will know major network protocols.
- EE 4 – Students will know the application and configuration of most important network devices.
- EE 5 – Students will able to use the selected function of operation systems, related to the network.
- EE 6 - Student will able to take the diagnostic steps and solve common problems of neural networks.
- EE 7 – Students will develop the ability to work alone and in the team and prepare the report from the work.

### CONTENT

Lectures		Hours
Lect. 1	Introduction to the network. Computer network topologies.	<b>2</b>
Lect. 2	Access to the medium. Transmission. Transmission media.	<b>2</b>
Lect. 3	The reference model ISO / OSI. Standards IEEE 802 and MAC addressing.	<b>2</b>
Lect. 4	Historical overview of selected LAN technologies.	<b>2</b>
Lect. 5	Ethernet. IEEE 802.3 standards.	<b>2</b>

Lect. 6	Wireless networks – 802.11, 802.15, 802.16 etc.	2
Lect. 7	Network devices.	2
Lect. 8	Classification of the networks.	2
Lect. 9	Internet and network services.	2
Lect. 10, 11	Selected protocols in neural networks.	4
Lect. 12	Routing.	2
Lect. 13	Wide area networks. SLIP, PPP protocols	2
Lect. 14	NAS and SAN. Virtualization.	2
Lect. 15	Connecting the LAN to the Internet and remote access.	2
<b>Laboratories</b>		<b>Hours</b>
Lab. 1	Cable connections and their diagnosis.	2
Lab. 2	Shared Ethernet networks.	2
Lab. 3	Switched Ethernet networks.	2
Lab. 4	Ring topologies networks.	2
Lab. 5, 6	Network traffic analyser, e.g. Wireshark.	4
Lab. 7	IPv4 configuration – static and dynamic address allocation.	2
Lab. 8	ICMP usage.	2
Lab. 9	Address translation, ARP and DNS usage.	2
Lab. 10	Managed switch.	2
Lab. 11, 12	Selected Windows and Linux network tools usage.	4
Lab. 13	IPv6 configuration – static and dynamic address allocation.	2
Lab. 14, 15	Routing.	4

## TEACHING TOOLS

1. – lectures using multimedia presentations
2. – blackboard and chalk or whiteboards and pens
3. – laboratory guides
4. – reports from laboratory activities
5. – computer stations with software
6. – diagnostic tools
7. – network devices

## LITERATURE

Andrew S Tanenbaum, David J. Wetherall, Computer Network, Pearson Education Ltd. 2013 (5 <sup>th</sup> Edition)
Mark A. Sportack, Tony Northrup, Networking Essentials Unleashed, Pearson Education Ltd. 2006
Karanjit S. Siyan, Tim Parker, TCP/IP Unleashed, Pearson Education Ltd. 2002
Frank J. Derfler Jr., Les Freed, Practical Network Cabling, QUE 1999
Barrie Sosinsky, Networking Bible, Wiley 2009

## TEACHERS

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## ADDITIONAL NOTES

Links to course unit teaching materials can be found on the [http://iisi.pcz.pl/Robert\\_Nowicki/fcn/](http://iisi.pcz.pl/Robert_Nowicki/fcn/) website for current students.