Faculty of Mathematics and Computer Science

Course title: **COMPUTER NETWORKS**

ECTS credit allocation (and other scores): **5**

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Natural sciences

Language: English/Polish

Number of hours per semester: 30 lectures + 30 classes = 60 hours

Course coordinator/ Department and e-mail: Erasmus coordinator Anna Szczepkowska/ WMiI, erasmuswmii.uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES:

Familiarity with how to work on virtual machines. Configure network card settings in Windows family systems. Familiarization with the basic computer network diagnostics software. Crimping RJ-45 plugs and testing them. Table exercises related to determining the network address, the number of hosts and the length of the IP mask. Viewing packets sent via popular protocols such as DHCP, DNS, HTTP.

LECTURES:

The history of computer networks. ISO/OSI, TCP/IP models. Types and topologies of networks. Physical layer: types of cabling, wireless transmission, digital modulation and multiplexing. Data link layer: sliding window protocols, MAC and LLC sublayers, Ethernet and Wi-Fi networks. Network layer: routing algorithms, complex networks, IPv4 and IPv6 protocols, addressing in IP networks, NAT. ICMP, ARP, DHCP protocols. Transport layer: Berkeley sockets, TCP and UDP protocols. DNS. Application layer: e-mail, SMTP, IMAP, POP3 protocols; WWW and HTTP protocol.

Learning purpose:

The aim of the course is to acquire basic knowledge of the principles of building computer networks, understanding the features of traditional and promising technologies of local networks, studying methods and means of creating large complex networks and managing such networks.

On completion of the study programme the graduate will gain:

Knowledge:

The student has fundamental knowledge of the architecture and protocols of computer networks necessary for the installation, operation and design of computer networks, including issues related to network security.

The student has structured knowledge of the basics of the communication infrastructure included in ICT networks, including wireless networks, and the configuration of these devices in local networks.

Skills:

The student recognizes the type of computer network and can configure communication devices in local ICT networks, can administer a computer network, and also uses appropriate diagnostic tools to solve problems encountered in the operation of computer networks, and manages network security.

The student identifies threats and defines the basic principles of computer network security.

The student can assess the usefulness of routine methods and tools for solving simple computer network administration tasks and select and apply appropriate methods and tools.

Social Competencies:

The student understands the need for lifelong learning, the social aspects of the practical application of the acquired knowledge and skills and the related responsibility, including the security of computer networks.

Basic literature:

1. Andrew S. Tanenbaum, David J. Wetherall, *Sieci komputerowe*, Wyd. Helion, R. 2012, s. 1024
2. James Kurose, Keith Ross, *Sieci komputerowe. Ujęcie całościowe.*, Wyd. James Kurose, Keith Ross, R. 2018

Supplementary literature:

1. Adam Józefiok, *CCNA 200-301. Zostań administratorem sieci komputerowych Cisco*, Wyd. Helion, R. 2020, s. 1048
2. Charles E. Spurgeon, Joann Zimmerman, *Ethernet. Biblia administratora*, Wyd. Helion, R. 2014
3. Russ White, Ethan Banks, *Sieci komputerowe. Najczęstsze problemy i ich rozwiązania*, Wyd. Helion, R. 2019
4. Barrie Sosinsky, *Sieci komputerowe. Biblia*, Wyd. Helion, R. 2011
5. Doug Lowe, *Sieci komputerowe dla bystrzaków*, Wyd. Helion, R. 2019

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 2.6 ECTS points

Student's independent work: 2.4 ECTS points