#### card of course

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| Subject name | Computer networks |

1. The placement of the subject in the study system

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| 1.1. Field of study | Computer science |
| 1.2. Form and path of study | Full-time/Part-time |
| 1.3. Level of education | First-cycle studies |
| 1.4. Study profile | Practical |

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| 1.5. Specialty | - |
| 1.6. Subject Coordinator | Dr Rafał Stęgierski |

2. General characteristics of the subject

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| 2.1. Belonging to a subject group | Directional/Practical |
| 2.2. Number of ECTS | 4 |
| 2.3. Language of lectures | Polish |
| 2.4. Semesters in which the subject is taught | I |
| 2.5.Criteria for selecting course participants | - |

1. Learning outcomes and course delivery
   1. Subject Objectives

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| No. | Subject Objectives |
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| C1 | Acquiring knowledge of the OSI Model and the TCP/IP model. |
| C2 | Acquiring knowledge of the Ethernet Standard. |
| C3 | Acquiring knowledge of TCP/IP protocols and addressing in IP networks. |
| C4 | Familiarization with routing in networks - static and dynamic (RIP, OSPF), Wireless networks. |
| C5 | Acquiring knowledge and skills in the field of static and dynamic addressing (DHCP, BOOTP, ARP/RARP), Subnetting. |
| C6 | Acquiring knowledge and skills in the field of UDP and TCP transport protocols. Principle of DNS operation. |

* 1. Subject-specific learning outcomes, divided into knowledge , skills and competences , with reference to the directional learning outcomes

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| No. | Description of subject  learning outcomes | Reference to  directional effects  learning (symbols) | Method of implementation (mark "X") | | | |
| ST | | NST | |
| Classes at the University | Activities on  the platform | Classes at the University | Activities on  the platform |
| After passing the course, the student knows and understands **the knowledge** | | | | | | |
| W1 | The student knows the theoretical basics of computer networks. | INF\_W01  INF\_W14 | X |  |  | X |
| W2 | The student has theoretical knowledge of the OSI/ISO model of computer networks. | X |  |  | X |
| W3 | The student has theoretical knowledge of the use of network cabling, ETHERNET standard. | X |  |  | X |
| W4 | The student has theoretical knowledge of TCP/IP protocols and addressing in IP networks. | X |  |  | X |
| W5 | The student has theoretical knowledge of routing in networks – static and dynamic routing (RIP, OSPF) and wireless networks. | X |  |  | X |
| After passing the course, the student is **able** to: | | | | | | |
| U1 | The student is able to present the types of computer networks, network topologies and characterize the OSI/ISO model of computer networks. | INF\_U11 INF\_U13 INF\_U22 INF\_U24 INF\_U25 | X |  | X |  |
| U2 | The student is able to design the logical network topology, including addressing. | X |  | X |  |
| U3 | The student is able to present the characteristics of basic communication protocols | X |  | X |  |
| U4 | The student is able to present the characteristics of static and dynamic IP addresses, is able to configure network routing, and characterize wireless networks. | X |  | X |  |
| After completing the course, the student is ready to take part in **social competences.** | | | | | | |
| K1 | Understands the need for additional education in  the field of computer networks and the mechanisms of their operation. | INF\_K01 INF\_K06 | X |  | X |  |
| K2 | Is able to convey his/her knowledge of computer networks in an understandable manner. | X |  | X |  |

3.3. Forms of teaching and their number of hours - Full-time studies (ST), Part-time studies (NST)

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| Path | Lecture | Exercises | Design | Workshop | Laboratory | Seminar | Lecturer | Classes conducted using distance learning methods and techniques in the form of a lecture | Other | **ECTS points** |
| **ST** | 15 |  |  |  | 30 |  |  |  |  | 4 |
| **NST** |  |  |  |  | 15 |  |  | 10 |  | 4 |

3.4. Content of education (separately for each form of classes: (W, ĆW, PROJ, WAR, LAB, LEK, OTHER). It should be marked (X) how the given content will be implemented (classes at the university or classes on the e-learning platform conducted using distance learning methods and techniques)

TYPE OF CLASS: LECTURE

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| --- | --- | --- | --- | --- | --- | --- |
| No. | Content of the course | Reference to subject-specific learning outcomes | Method of implementation (mark "X") | | | |
| ST | | NST | |
| **Classes at the University** | **Activities on  the platform** | **Classes at the University** | **Activities on  the platform** |
| 1. | OSI model and TCP/IP model.  Ethernet Standard. TCP/IP Protocols. | W1-W5 | X |  |  | X |
| 2. | Addressing in IP networks.  Static and dynamic addressing (DHCP, BOOTP, ARP/RARP). | W1-W5 | X |  |  | X |
| 3. | Subnetting, UDP and TCP transport protocols. Principle of DNS operation. | W1-W5 | X |  |  | X |
| 4. | Routing in networks - static and dynamic (RIP, OSPF), Wireless networks. | W1-W5 | X |  |  | X |
| 5. | Summary of classes and discussion of grades. |  | X |  |  | X |

TYPE OF CLASS: LABORATORY

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| No. | Content of the course | Reference to subject-specific learning outcomes | Method of implementation (mark "X") | | | |
| ST | | NST | |
| **Classes at the University** | **Activities on  the platform** | **Classes at the University** | **Activities on  the platform** |
| 1. | Exercises: OSI model and TCP/IP model. Ethernet standard. TCP/IP protocols. | U1-U4  K1-K2 | X |  | X |  |
| 2. | Exercises: Addressing in IP networks. Static and dynamic addressing (DHCP, BOOTP, ARP/RARP). | U1-U4  K1-K2 | X |  | X |  |
| 3. | Exercises: Subnetting, UDP and TCP transport protocols, Principle of operation of DNS. | U1-U4  K1-K2 | X |  | X |  |
| 4. | Exercises: Routing in networks - static and dynamic, Wireless networks | U1-U4  K1-K2 | X |  | X |  |
| 5. | Summary of classes and discussion of grades. |  | X |  | X |  |

3.5. Methods of verifying learning outcomes (indication and description of methods of conducting classes and verification of achievement of learning outcomes and method of documentation)

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| --- | --- | --- | --- |
| Subject Effects | Teaching methods | Methods of verifying learning outcomes | Documentation methods |
| KNOWLEDGE | | | |
| W1-W5 | Lecture with the use of multimedia | Exam – 100% grade from the lecture | Graded exam |
| SKILLS | | | |
| U1-U4 | Working with virtual systems, performing laboratory exercises | Lab project . Three tasks consisting of: creating, configuring a local network with VLAN, creating and configuring a local network with access to external networks, with separation of groups of computers, creating and configuring a wide area network with configuring routing between networks.  Grade from solved tasks (average of tasks) | Files uploaded to PUW platform |
| SOCIAL COMPETENCES | | | |
| K1-K2 | Performing lab exercises. Collaborating on joint network problem solving. Searching for solutions to problems on the Internet. | Lab project . Three tasks consisting of: creating, configuring a local network with VLAN, creating and configuring a local network with access to external networks, with separation of groups of computers, creating and configuring a wide area network with configuring routing between networks.  Grade from solved tasks (average of tasks) | Files uploaded to PUW platform |

3.6. Assessment criteria for the achieved learning outcomes

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| Learning effect | For a grade of 3 or "pass."  the student knows and understands/is able to/is ready to | For a grade of 3.5, the student knows and understands/is able to/is ready to | For a grade of 4, the student knows and understands/is able to/is ready to | For a grade of 4.5, the student knows and understands/is able to/is ready to | For a grade of 5, the student knows and understands/is able to/is ready to |
| W | 51-60% of knowledge indicated in learning outcomes | 61-70% of knowledge indicated in learning outcomes | 71-80% of knowledge indicated in learning outcomes | 81-90% of knowledge indicated in learning outcomes | 91-100% of knowledge indicated in learning outcomes |
| U | 51-60% of skills indicated in learning outcomes | 61-70% of skills indicated in learning outcomes | 71-80% of skills indicated in learning outcomes | 81-90% of skills indicated in learning outcomes | 91-100% of skills indicated in learning outcomes |
| K | 51-60% of skills indicated in learning outcomes | 61-70% of skills indicated in learning outcomes | 71-80% of skills indicated in learning outcomes | 81-90% of skills indicated in learning outcomes | 91-100% of skills indicated in learning outcomes |

3.7. Literature

**Basic**

1. Józefiok A., CCNA 200-301. Zostań administratorem sieci komputerowych Cisco, wyd. Helion, 2020.
2. Jozefiok A., „W drodze do CCNA”, wyd. Helion, 2012

**Supplementary**

1. Tanenbaum, Andrew S., Wetherall, David. Sieci komputerowe. Wyd. 5, Helion, 2012.
2. Comer, Douglas E. Sieci komputerowe i intersieci : kompendium wiedzy każdego administratora. Wyd. 5, Helion, 2012.

4. Student workload - ECTS points balance

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| --- | --- | --- |
| **Types of student activity** | **Student Load** | |
| **ST** | **NST** |
| **Classes requiring direct contact between the student and the academic teacher at the university premises** | **45** | **25** |
| Classes included in the study plan | 45 | 25 |
| **Student's own work** | **55** | **75** |
| Ongoing preparation for classes, preparation of project work/presentations/etc. | 25 | 35 |
| Preparation for passing classes | 30 | 40 |
| **TOTAL STUDENT HOURLY LOAD** | **100** | **100** |
| **Number of ECTS points** | **4** | **4** |

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| Last change date | 30/09/2024 |
| The changes were introduced | INF Education Quality Team |
| The changes were approved | Arkadiusz Gwarda, M.A. |