Załącznik nr 2 do Zarządzenia Nr 915 z 2019 r. Rektora PB

**COURSE DESCRIPTION CARD**

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| **Faculty of Electrical Engineering** | | | | | | | | | | |
| **Field of study** | **Electrical and Electronic Engineering** | | | | | | | **Degree level and programme type** | **master's degree, full time programme** | |
| **Specialization/ diploma path** |  | | | | | | | **Study profile** |  | |
| **Course name** | **TCP/IP Networks and Applications** | | | | | | | **Course code** | **IS-FEE-20004W** | |
| **Course type** | **elective** | |
| **Forms and number of hours of tuition** | **L** | **C** | **LC** | **P** | **SW** | **FW** | **S** | **Semester** | **winter** | |
| **30** |  |  |  | **15** |  |  | **No. of ECTS credits** | **6** | |
| **Entry requirements** | **Network Technologies or equivalent.** | | | | | | | | | |
| **Course objectives** | **Acquiring detailed knowledge of family of TCP/IP protocols and their applications.** | | | | | | | | | |
| **Course content** | **History of family of TCP/IP protocols, their architecture and development. Structure of IP packets in version 4 and 6.Addressing devices in IP networks. IP multicast groups and multicast addressing. Structure ofTCP segmentand UDP datagram. TCP communication session. Flow control in TCP transmission. Auxiliary protocols used in TCP/IP networks: ICMP, ARP, DHCP and other. Static and dynamic routing in TCP/IP networks. Idea of autonomous system (AS). Interior and exterior routing protocols. Obtaining provider independent (PI) IP addresses. VirtualLocal Area Networks (VLAN). IP routing between VLANs. MPLS networks. Network Address Translation protocol (NAT). Traffic aggregation and load balancing in TCP/IP networks. Voice over IP (VoIP) technology. Selected services in TCP/IP networks.** | | | | | | | | | |
| **Teaching methods** | **lecture, specialization workshop.** | | | | | | | | | |
| **Assessment method** | **lecture: tests; specialization workshop: evaluating the student's performance in classes, presentation on given subject.** | | | | | | | | | |
| **Symbol of learning outcome** | **Learning outcomes** | | | | | | | | **Reference to the learning outcomes for the field of study** | |
| **LO1** | **can describe of a process of layered communications in TCP/IP networks;** | | | | | | | |  | |
| **LO2** | **has comprehensive knowledge of functioning of main and auxiliary protocols used in TCP/IP networks and their cooperation (including application protocols);** | | | | | | | |  | |
| **LO3** | **is capable of explaining flow control methods used by TCP protocol;** | | | | | | | |  | |
| **LO4** | **is able to describe organization of external routing in the Internet;** | | | | | | | |  | |
| **LO5** | **can differentiate and explain packet forwarding processes in IP networks with classical routing and with label-based switching (MPLS);** | | | | | | | |  | |
| **LO6** | **depicts advanced configurations of networks and applications including VLAN technology, server clusters and cloud-based solutions;** | | | | | | | |  | |
| **LO7** | **can prepare multimedia presentation on given subject connected with module content** | | | | | | | |  | |
| **Symbol of learning outcome** | **Methods of assessing the learning outcomes** | | | | | | | | **Type of tuition during which the outcome is assessed** | |
| **LO1** | **tests on lecture content** | | | | | | | | **L** | |
| **LO2** | **tests on lecture content, evaluating the student's performance in classes** | | | | | | | | **L, SW** | |
| **LO3** | **tests on lecture content, evaluating the student's performance in classes** | | | | | | | | **L, SW** | |
| **LO4** | **tests on lecture content, evaluating the student's performance in classes** | | | | | | | | **L, SW** | |
| **LO5** | **tests on lecture content** | | | | | | | | **L** | |
| **LO6** | **tests on lecture content** | | | | | | | | **L** | |
| **LO7** | **evaluating the student's presentations** | | | | | | | | **SW** | |
| **Student workload (in hours)** | | | | | | | | | **No. of hours** | |
| **Calculation** | **lecture attendance** | | | | | | | | **30** | |
| **participation in specialization workshop** | | | | | | | | **15** | |
| **participation in specialization workshop** | | | | | | | | **15** | |
| **work on presentations** | | | | | | | | **20** | |
| **implementation of project tasks (homework)** | | | | | | | | **40** | |
| **preparation for and participation in exams/tests** | | | | | | | | **30** | |
| **TOTAL:** | | | | | | | | **150** | |
| **Quantitative indicators** | | | | | | | | | **HOURS** | **No. of ECTS credits** |
| **Student workload – activities that require direct teacher participation** | | | | | | | | | **45** | **2** |
| **Student workload – practical activities** | | | | | | | | | **90** | **4** |
| **Basic references** | **1. Mahbub H., Raj J.: High performance TCP/IP networking. Prentice Hall, 2003.**  **2. Sportack M.: IP addressing fundamentals. Cisco Press, 2002.**  **3. Comer D.E.: Internetworking with TCP/IP, vol 1. Prentice Hall, 2005.**  **4. Stevens W.R., Wright G.R.: TCP/IP illustrated, vol. 1-3. Addison-Wesley, 2001.**  **5. Bourke T.: Server load balancing. O'Reilly Media, 2001.** | | | | | | | | | |
| **Supplementary references** | **1. Comer D.E., Stevens D.L.: Internetworking with TCP/IP, vol 2. Prentice Hall, 1998.**  **2. RFC documents (available at www.rfc-editor.org).** | | | | | | | | | |
| **Organisational unit conducting the course** | **Department of Photonics, Electronics and Light Technique** | | | | | | | | **Date of issuing the programme** | |
| **Author of the programme** | **Andrzej Zankiewicz, Ph.D. Eng.** | | | | | | | | **09.02.2020** | |

**L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,**

**S – seminar**