

1. Course title: DESIGN & CONFIGURATION OF LAN INFRASTRUCTURE		2. Course code: DCLI		
3. Validity of course description: 2017/18				
4. Level of studies: 1 st cycle of higher education				
5. Mode of studies: intramural studies				
6. Field of study: MACROFACULTY (RAU)				
7. Profile of studies: general academic				
8. Programme: Control, Electronic, and Information Engineering				
9. Semester: 6				
10. Faculty teaching the course: Institute of Informatics				
11. Course instructor: Mirosław Skrzewski PhD				
12. Course classification: common				
13. Course status: elective				
14. Language of instruction: English				
15. Pre-requisite qualifications: Knowledge and basic understanding of operation of the computer networks and operating systems.				
16. Course objectives: The course deals with basic solutions of wired and wireless local area network infrastructure. Principles of structural cabling design, wireless LAN communication, protocol configuration and WAN interconnection will be presented, along with the VLAN design and configuration.				
17. Description of learning outcomes:				
Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1	Student possesses basic knowledge of network cable design and cabling categories.	CL, SP	WM, L	K1A_W11, K1A_U3, K1A_U9
2	Student knows and understands the principles of operation of basic infrastructure elements like hubs and switches.	CL, SP	WM, L	K1A_W14, K1A_U3
3	Student possesses elementary knowledge of the operation of wireless link technologies.	CL, SP	WM, L	K1A_W5, K1A_W11, K1A_U3
4	Student understands the concept of LAN topology configuration of Spanning Tree Protocol.	CL, SP	WM, L	K1A_W14, K1A_U11
5	Student understands elementary operation of selected LAN configuration protocols, e.g. RARP, BOOTP, DHCP, APIPA.	CL, SP	WM, L	K1A_W14, K1A_U11

18. Teaching modes and hours

Lecture / BA /MA Seminar / Class / Project / Laboratory

Lecture - 15 h., Lab. 15 h

19. Syllabus description:**Lectures:**

The concept of LAN infrastructure. Classical Ethernet (802.3, Ethernet v2.0) segment design, transceiver, terminators, repeaters, collision domain, broadcast domain. Versions of standard (10BaseT, 10BaseF, 10Base2). Modification of basic principles of network operation – introduction of store & forward technology (hub, switch, managed switch operation). Modification of topology, problems with loops, spanning tree protocol. Virtual networks (VLAN), VLAN connections, 802.1Q protocol, VLAN configuration. Standards Fast Ethernet (100BaseT), 1G Ethernet, 10G Ethernet, cabling standards. Cables UTP, STP, connectors, cables categories cat3, cat5, cat5e, cat6.

Wireless LAN connections, standards 802.11a/b/g/n, Bluetooth, 802.16, network organization, ad-hoc, infrastructure networks, radio network access control, connection security. Access point configuration, radio bandwidth and channel allocation.

LAN systems IP configuration, protocols rarp, arp, bootp, dhcp, apipa. LAN – WAN interconnections, access line protocols, serial protocols SLIP, PPP, PPPoE, protocol tunneling. Access router, network address translation, problems of LAN systems security and LAN access protection.

Laboratory:

During lab exercises students has admin access to typical devices used in network infrastructures and familiarize with their configuration, testing tools and network protocol configuration. There are planned following lab exercises:

1. Wireless LAN channel configuration and testing
2. Testing of physical network cabling infrastructure
3. Managed switches infrastructure configuration
4. LAN IP protocol configuration and testing
5. Monitoring of LAN protocol operation
6. WAN access router configuration

20. Examination: no**21. Primary sources:**

1. W. Stallings, *Data and Computer Communications*, Prentice-Hall Int.
2. Kurose J., Ross K., *Computer Networking: A top-down approach*.
3. D. Comer, *Internetworking with TCP/IP, Vol. I: Principles, Protocols, and Architecture*.

22. Secondary sources:

1. J. Haugdahl, *Diagnozowanie i utrzymywanie sieci*, Helion
2. M. Sportach, *Sieci komputerowe księga eksperta*, Helion

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	15/15
2	Classes	- / -
3	Laboratory	15/15
4	Project	- / -
5	BA/ MA Seminar	- / -
6	Other	- / -
	Total number of hours	30/30

24. Total hours: 60**25. Number of ECTS credits: 2**

26. Number of ECTS credits allocated for contact hours: 1
27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 1
26. Comments:

Approved:

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(date, Instructor's signature)

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(date, the Director of the Faculty Unit signature)