(faculty stamp)   **COURSE DESCRIPTION**

1. Course title: WIRELESS COMPUTER NETWORKS	**2. Course code**

3. Validity of course description: 2017/2018

4. Level of studies: MA,MSc programme / 2nd cycle of higher education

5. Mode of studies: intramural studies

6. Field of study: MACROFACULTY	(FACULTY SYMBOL)

7. Profile of studies: general, practical

8. Programme: Electronics, Informatics

9. Semester: 2

10. Faculty teaching the course: Institute of Informatics

11. Course instructor: dr hab. inż. Bartłomiej Zieliński

12. Course classification:

13. Course status: compulsory

14. Language of instruction: English

15. Pre-requisite qualifications: Computer Networks, Microprocessor Systems, Embedded Systems

16. Course objectives: The course presents practical aspects of creation and exploitation of wireless computer networks. It discusses mainly protocols and standards of such networks.

17. Description of learning outcomes:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Has theoretically supported detailed knowledge corresponding to the key problems of operating systems, internet technologies and security of computer systems and networks	SP, CL, PS	W, L	K2A_W15
2.	Can configure communication devices in local and wide area (wired and radio) teleinformatics networks	SP, CL, PS	W, L	K2A_U22
3.	Can cooperate and work in group accepting various roles	CL, PS	L	K2A_K03
4.				

18. Teaching modes and hours
Lecture / BA /MA Seminar / Class / Project / Laboratory
15 / 0 / 0 / 0 / 15

19. Syllabus description:

1. Wireless WANs. Packet Radio network: architecture, radio link parameters, AX.25 protocol, addressing rules. Intermediate and relaying stations. TNC controllers, BayCom modems.
2. Wireless LANs. IEEE 802.11 standard. Genesis. Basic terms, network architecture. Physical layers, signal processing. Medium access protocol – DFWMAC.
3. Wireless PANs. Applications. IrDA system. Architecture and physical layers. IrLAP, IrLMP, IrCOMM, IrLAN, IrMC, IrTran-P protocols. BlueTooth system. Network topology, system architecture. Radio link, link controllers. Frame types and structure. Higher level layers. A comparison of IrDA and Bluetooth.
4. GSM standard. Cellular telephony. GSM Architecture. Frequency ranges. Framing in GSM. Signal processing. Data transmission services in GSM. CSD, HSCSD, GPRS, EDGE methods. Architecture of GSM/GPRS network. Modulation and coding schemes for GPRS and EDGE. Hardware classes.
5. Wireless media characteristics. Digital radio communications system structure. Modulation methods. Radiocommunication system parameters design. Spread spectrum systems (DSSS, FHSS, THSS, *chirp*, CDMA). Modulation in optical systems. Law restrictions and general technical parameters of wireless links.
6. Medium access protocols in wireless local networks. Problem description. Hidden and exposed nodes, capture effect,

interference. Collision avoidance methods for wireless ad-hoc networks: busy-tone, control frames exchange, separate control channel. Collsion detection by means of pauses.
7. Wireless ATM networks. An introduction to wireless ATM issues. Application examples. Physical layer considerations. Examples of MAC protocols for wireless ATM.

Laboratories:
1. Packet Radio network and TNC controllers
2. IEEE 802.11 local area networks
3. Bluetooth and IrDA personal area networks
4. Low power radio circuits
5. GPS
6. GSM data transfer

20. Examination: no (optional)

---

21. Primary sources:

Zieliński B.: *Bezprzewodowe sieci komputerowe*. Helion, Gliwice 2000 (in Polish)
Tanenbaum A. S.: *Computer Networks (Fourth Edition)*. Prentice Hall, 2003.
Stojmenović I. (ed.): *Handbook of Wireless Networks and Mobile Computing*. Wiley, 2002.
Prasad N., Prasad A. (eds.): *WLAN Systems and Wireless IP for Next Generation Communications*. Artech House, 2002.
Wesołowski K.: *Mobile Communication Systems*. Wiley, 2002.
Held G.: *Deploying Wireless LANs*. McGraw-Hill TELECOM, 2002.
Toh C.-K.: *Wireless ATM and Ad-Hoc Networks. Protocols and Architectures*. Kluwer Academic Publishers, 1997.
Bing B.: *High-Speed Wireless ATM and LANs*. Artech House, 2000.
Rom R., Sidi M.: *Multiple Access Protocols. Performace and Analysis*. Springer-Verlag, New York 1990.
Flickenger R.: *Wireless Hacks 100 Industrial-Strength Tips & Tools*. O'Reilly, 2003.
Potter B., Fleck B.: *802.11 Security*. O'Reilly, 2002.
Gast M.: *802.11 Wireless Networks: The Definitive Guide*. O'Reilly, 2002.
Heltzel P.: *Complete Wireless Home Networking*. Prentice Hall, 2003.
Roshan P., Leary J.: *802.11 Wireless LAN Fundametals*. Cisco Press, 2004.
Sankar K., Sundaralingam S., Balinsky A., Miller D.: *Cisco Wireless LAN Security*. Cisco Press, 2004.
Engst A., Fleischman G.: *The Wireless Networking Starter Kit*, Prentice Hall, 2004.
Barken L. et al: *Wireless Hacking. Projects for Wi-Fi Enthusiasts*. O'Reilly, 2004.
Vladimirov A., Gavrilenko K. V., Mikhailovsky A. A.: *Wi-Foo: The Secrets of Wireless Hacking*. Addison-Wesley, 2004.
Basagni S., Conti M., Giordano S., Stojmenović I. (eds.): *Mobile Ad-Hoc Networking*. Wiley, 2002.
Sikora A.: *Wireless Personal and Local Area Networks*. Wiley, 2003.

22. Secondary sources:

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:

26. Number of ECTS credits allocated for contact hours:

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

26. Comments:

Approved:

…………………………   ……………………………………………
(date, Instructor's signature)   *(date , the Director of the Faculty Unit signature)*