

1.	Course	<i>Advanced Wireless Computer Networks</i>		
2.	Code	KNI_E12		
3.	Study programme	Computer Science and Engineering PhD study programme		
4.	Study programme organized by	FCSE		
5.	Cycle	Third – PhD		
6.	Academic year / semester winter/summer/elective	7. ECTS credits 7,5		
8.	Teacher	Prof. d-r Sonja Filiposka		
9.	Prerequisites	None		
10.	Course programme goals (competences): The students will be capable to analyze and design wireless computer networks.			
11.	Course syllabus: Overview of wireless communication systems and standards. Detailed analysis of Wi-Fi, Bluetooth, Wi-Max, as well as 3G and 4G networks. Special attention will be given to composite, ad-hoc and sensor networks. Overview of the active problems for different types of wireless networks, future plans of wireless mobile systems development. Defining the current status of network performances on each of the TCP/IP levels. Overview of supported services like mobile computing, location based services, mobile video streaming. Security standards and security problems in wireless networks. Introduction to research topics and possible solution directions. Problems connected to radio propagation, modeling and simulation. Smart antennas, using MIMO to achieve better performances. Development of embedded and FPGA based solutions with hardware and software implementation of the MAC level. Performance problems on MAC level, developing efficient routing protocols in constantly changing environment, transport protocols adjustments for wireless environment. Estimation and analysis of wireless networks performances.			
12.	Teaching methods: Classes supported with slide presentations, interactive teaching, lab equipment and other software packages, teamwork, case studies, invited guest lecturers, presentations of project works, e-learning materials, forums and consultations.			
13.	Total fund of work hours	7,5 ECTS x 30 h = 225 h		
14.	Available hours distribution	45+30+150 = 225		
15.	Teaching activities	15.1.	Theoretical classes	45 h
		15.2.	Practical classes (labs, exercises), seminars, team work	30 h
16.	Other activities	16.1.	Project tasks	50 h
		16.2.	Self study	50 h
		16.3.	Homework	50 h
17.	Grading			
	17.1.	Tests	40 points	
	17.2.	Seminar work/ project (presentation: written and oral)	50 points	

17.3.	Active participation				10 points	
18.	Grading criteria (points/grade)		to 59 points		5 (five) (F)	
			from 60 to 68 points		6 (six) (E)	
			from 69 to 76 points		7 (seven) (D)	
			from 77 to 84 points		8 (eight) (C)	
			from 85 to 92 points		9 (nine) (B)	
	from 93 to 100 points				10 (ten) (A)	
19.	Conditions for attending the final exam	Successful completion of activities 15.1 and 15.2				
20.	Language	Macedonian or English				
21.	Quality assessment	Internal evaluation and student pools				
22.	Literature					
	22.1.	Compulsory				
		No.	Author	Title	Publisher	Year
		1.	Kaveh Pahlavan, Prashanth Krishnamurthy	Principles of Wireless Networks, 2nd Revised edition	John Wiley & Sons Inc	2010
		2.	Dharma P. Agrawal, Bin Xie	Encyclopedia On Ad Hoc And Ubiquitous Computing: Theory and Design of Wireless Ad Hoc, Sensor, and Mesh Networks	World Scientific Publishing Company	2009
	3.	Anurag Kumar, D. Manjunath, Joy Kuri	Wireless Networking	Morgan Kaufmann	2008	
	22.2.	Additional				
		No.	Author	Title	Publisher	Year
		1.	Xiangyang Li	Wireless Ad Hoc and Sensor Networks: Theory and Applications	Cambridge University Press	2008
		2.				
3.						