1.	Course title	**Mobile services and applications**		
2.	Course code	KMET-I-09		
3.	Study program	**Computer networks and e-technologies**		
4.	Unit offering the course	**FCSE**		
5.	Undergraduate/master/PhD	**Master**		
6.	Year/semester 1(2)/summer/elective	7. ECTS: **6**		
8.	Teacher(s)	Assist. Prof. Sonja Filiposka		
9.	Course prerequisites	None		
10.	Goals (competences): After successfully completing the course, the student is expected to understand the mobile networks architecture and services. The student will be able to develop software for mobile devices with different OS like iOS, Android, Windows.			
11.	Course content: Basic mobile network topology. Mobile vs. fixed telephone networks. Mobile networks planning. QoS planning. Handoff. Cell division techniques, multilevel coverage, forced hand-off. 1st to 2nd generation od mobile technologies – main characteristics. Voice digitalization and speech compression. Packet transmission (2.5G) and Internet connections. 3rd generation of mobile technologies. UMTS and other standards. 4G and hybrid mobile networks. Protocols and interfaces for IP applications development on mobile devices. Roaming. Mobile applications and additional services. Mobile device programming. Mobile Information Device Profile (MIDP). Design techniques for small devices and screens.			
12.	Teaching methods: Lectures supported by slide presentations, interactive lectures, trainings (using lab equipment and software packages), team work, case studies, invited guests and lectures, individual practical assignments presentations, seminar paper, e-learning (forums, consultations).			
13.	Total available time	6 ECTS x 30 hours = 180 hours		
14.	Distribution of the available time	30 + 15 + 135 = 180 hours		
15.	Teaching activities	15.1.	Lectures	30 hours
		15.2.	Training (labs, problem solving), seminar and team work	15 hours
16.	Other activities	16.1.	Project work	60 hours
		16.2.	Self study	25 hours
		16.3.	Home work	50 hours
17.	Grading			
	17.1.	Tests		45 points
	17.2.	Seminar work/project (written or oral presentation)		45 points
	17.3.	Active participation		10 points
18.	Grading criteria	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.	Final exam prerequisites	Successfully completed activities 15.1 and 15.2	
20.	Course language	Macedonian and English	
21.	Quality assurance methods	Internal evaluation and student questionnaires	

22. Literature

22.1. Compulsory

No.	Authors	Title	Publisher	Year
1.	Stefania Sesia, Issam Toufik, Matthew Baker	LTE - The UMTS Long Term Evolution: From Theory to Practice	Wiley; 2 edition	2011
2.	Juan Ramiro, Khalid Hamied	Self-Organizing Networks (SON): Self-Planning, Self-Optimization and Self-Healing for GSM, UMTS and LTE	Wiley	2012
3.	Mark Grayson, Kevin Shatzkamer, Klaas Wierenga	Building the Mobile Internet (Networking Technology)	Cisco Press	2011

22.2. Additional

No.	Authors	Title	Publisher	Year
1.	William Webb	The Complete Wireless Communications Professional	Artech House	2002
2.	Harri Holma, Antti Toskala	WCDMA for UMTS: Radio Access for Third Generation Mobile Communications	Wiley, John & Sons	2000
3.	Benny Bing	High-Speed Wireless ATM and LANs	Artech House, Incorporated	2000