

1.	Course title	Advanced computer networking		
2.	Course code	KMET-I-07		
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. Igor Mishkovski		
9.	Course prerequisites	None		
10.	Goals (competences): After successfully completing the course, the student is expected to understand the modern routing protocols. The student will be able to design networks with high performances.			
11.	Course content: Routing protocols: EIGRP, OSPF, PNNI, IS-IS, RIP. Reliable flooding. Hierarchical routing. EGP, BGP-4, CIDR. Availability. Resilience. Protection/renewal, fast rerouting. Quality of service (QoS) QoS specification, traffic characterisation, basic mechanisms; Scheduling. QoS architectures. Guaranteed services. End-to-end adaptive applications. H.323 architecture. OverQoS; Content delivery. Traffic Engineering. Designing very fast routers. Second generation of networking systems. Switch Fabric, Multi-Stage Fabrics. Forwarding, port mapping. Switching and linking. Network processors: building blocks for programmable networks. CAM and Ternary CAM; IXP. XScale Core processor. Microengines – RISC processor; Micro-engine C compiler. Challenges while designing modern Tera-bit class switches. 100Tb/s optical router. 160Gb/s Linecard. Label switching and MPLS; IP routing and IP switching. MPLS; RSVP; Limited routing; Multicast; Multicast in LAN; IP Multicast architecture. IGMP; Application level multicast.			
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)		
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.	Q. Li, J. Tatuya, K. Schima	IPv6 Advanced Protocols Implementation	Morgan Kaufmann	2007
		2.	Benoit Claise	Network Management: Accounting and Performance Strategies	Cisco Press	2007
		3.		Selected papers		
	22.2.	Additional				
		No.	Authors	Title	Publisher	Year
		1.				
		2.				
	3.					