

1.	Course title	Stochastic modelling and Queuing theory		
2.	Course code	KMET-I-04		
3.	Study program	Computer networks and e-technologies		
4.	Unit offering the course	FCSE		
5.	Undergraduate/master/PhD	Master		
6.	Year/semester 1(2)/winter/elective	7. ECTS: 6		
8.	Teacher(s)	Assist. Prof. Dejan Spasov		
9.	Course prerequisites	None		
10.	Goals (competences): After successfully completing the course, the student is expected to be able to model systems using Markov chains and define and model queuing systems. The student will be able to implement the mathematical models in engineering practical examples for the purposes of modelling and analysis of network traffic and performances.			
11.	Course content: Introduction. Selected themes of probability theory. Renewal theory and regenerative processes. Discrete Markov chains. Continuous Markov chains. Introduction to queuing theory. Queuing theory. Reversibility and queuing networks. M/G/1 and GI/M/c. Wandering and GI/G/1. Work conserving and priority queues. Multilevel queues. Grading and approximations. Blocking queues. Self-similarity. Self-similar processes. Network traffic and performance analysis.			
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		40 points
	17.2.	Seminar work/project (written or oral presentation)		45 points
	17.3.	Active participation		15 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.	Wolff, R. W.	Stochastic Modeling and the Theory of Queues	Prentice Hall	1989
		2.	Perros, H. G.	Queueing Networks with Blocking: Exact and Approximate Solutions	Oxford University Press	1994
		3.	Kleinrock L. and Gail R.	Queueing Systems: Problems and Solutions	John Wiley & Sons	1996
	22.2.	Additional				
		No.	Authors	Title	Publisher	Year
		1.	Steve Jones, Stephen R. Covey	Focus: Achieving Your Highest Priorities	Franklin Covey	2003
		2.				
	3.					