

1.	Course	<i>Networks</i>		
2.	Code	KNI_E5		
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 Ljupcho Kocarev		
9.	Prerequisites	None		
10.	Course programme goals (competences): Enabling the students to apply and work with mathematical models of networks as well as use the models in order to solve real world problems. The student will be capable to design mathematical models that describe network dynamic processes.			
11.	Course syllabus: In this course the connection between the social, technological and natural worlds, as well as the mathematical network theory applied on this connections will be studied. The course topics include: how opinions, fads, political influence spreading in the network, robustness and falls of the food and financial markets, technology, economics and politics of web information and on-line communities. The course will cover the following areas: graph theory and social networks, game theory, markets and strategic network interaction, information networks, world-wide web, network dynamics and cascade behavior, biological networks. The main course goal is to develop mathematical models for dynamic network processes. Thus, it is expected that the students will learn how to apply and work with mathematical models, as well as apply them for solving real life phenomena.			
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 EKTC 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)		
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
		1.	A-L. Barabasi	Linked: How Everything Is Connected to Everything Else and What It Means	Perseus Publishing, New York
		2.	T. G. Lewis	Network Science: Theory and Applications	Wiley, New York
	3.	S. Bornholdt and H. G. Schuster (Editors)	Handbook of Graphs and Networks: From the Genome to the Internet	Wiley-VCH	
	22.2.	Additional			
		No.	Author	Title	Publisher
		1.			
		2.			
3.					