1.	Course		*Soft Computing*	
2.	Code		KNI_E20	
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 Dejan Gjorgjevikj	
9.	Prerequisites		None	
10.	Course programme goals (competences): The students will be able to apply the soft computing techniques to find inexact and quasi-optimal solutions for computationally NP hard problems for which an exact solution cannot be found in polynomial time. The students will be familiar with soft computing techniques and fuzzy logic, neural networks and evolutive computation, which differ the conventional artificial intelligence and computations in their tolerance to imprecision, partial truth and approximation.			
11.	Course syllabus: Introduction. Complexity and NP hard problems. Imprecision tolerance, uncertainty, partial truth and approximation. Fuzzy systems, Neural networks, Machine learning, Probability based decisions, Genetic algorithms, Simulated annealing, Tabu search, Hybrid approaches.			
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)	
			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.	Vojislav Kecman	Learning and Soft Computing: Support Vector Machines, Neural Networks, and Fuzzy Logic Models	The MIT Press	2001
		2.	Fakhreddine Karray and Clarence De Silva	Soft Computing and Intelligent Systems Design: Theory, Tools and Applications	Addison Wesley Publishing	2004
		3.	Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani	Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence	Prentice Hall	1997
	22.2.	Additional				
		No.	Author	Title	Publisher	Year
		1.		Selected papers Journal of Soft Computing	Springer	
		2.		Selected papers Applied Soft Computing	Elsevier	
		3.				