1.	Course Title	Biology inspired computing
2.	Code	F18L3S078
3.	Study program	Software engineering and information systems
4.	Study Program Organizer	Faculty of Computer Science and Engineering
5.	Degree (first, second, third cycle)	first cycle
6.	Academic year / semester 4 / summer / optional	7. ECTS credits 6
8.	Teacher	assistant professor Kire Trivodaliev
9.	Course enrollment prerequisites	Алгоритми и податочни структури и Вештачка интелигенција
10.	Course program goals (competencies): The goal of this course is to introduce students to algorithms inspired by naturally appearing phenomena and their application in solving problems in optimization, design and learning. The focus will be on algorithms abstraction from the observed phenomena, analysis and comparison of their results. Within the course special attention will be given to specific applications to the aforementioned algorithms. Upon completion students should acquire the following: - Knowledge of naturally occurring phenomena that are the inspiration for the learned algorithms - Understanding of the strengths and weaknesses of learned algorithms - Ability to identify the appropriateness of learned algorithms and their application to problems of optimization, design and learning	
11.	Course program content: Introduction to biologically inspired computation; Search and optimization; Local search techniques; Genetic algorithms; Genetic programming; Swarm intelligence; Ant colony optimization; Particle swarm optimization; Artificial bee colony; Artificial immune systems; Neural networks; Self-organizing neural networks; Constraint satisfaction; Other biologically inspired heuristics;	
12.	Learning methods: Lectures using presentations, interactive lectures, exercises (using equipment and software packages), teamwork, case studies, invited guest lecturers, independent preparation and defense of a project assignment and seminar work.	
13.	Total available time	6 ECTS x 30 hours = 180 hours
14.	Distribution of the available time	30 + 45 + 15 + 15 + 75 = 180 hours

15.	Teaching activity forms	15.1.	Lectures – theoretical teaching	30 hours
		15.2.	Exercises (laboratory, auditory), seminar papers, teamwork	45 hours
16.	Other activity forms	16.1.	Project Tasks	15 hours
		16.2.	Independent Learning Tasks	15 hours
		16.3.	Home learning	75 hours

17.	Assessment methodology		
	17.1.	Tests	10 points
	17.2.	Seminar paper/project (presentation: written and oral)	10 points
	17.3.	Activity and learning	10 points
	17.4.	Final exam	70 points

18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)
		51 to 60 points	6 (six) (E)
		61 to 70 points	7 (seven) (D)
		71 to 80 points	8 (eight) (C)
		81 to 90 points	9 (nine) (B)
		91 to 100 points	10 (ten) (A)

19.	Course completion and final exam requirements	Realized activities 15.1 and 15.2
20.	Teaching Language	Macedonian and English
21.	Teaching quality evaluation method	Internal evaluation mechanisms and questionnaires

22.	Course Material	
	22.1.	Mandatory course material

	No.	Author	Title	Publisher	Year
	1	L. N. de Castro	Fundamentals of Natural Computing: Basic Concepts, Algorithms, and Applications	CRC Press	2006
	2	D. Floreano and C. Mattiussi	Bio-Inspired Artificial Intelligence: Theories, Methods, and Technologies	MIT Press	2008
	3	D. Simon	Evolutionary Optimization Algorithms	Wiley	2013

22.2. Additional course material

No.	Author	Title	Publisher	Year