1.	Course title	**Sensor-Robotic systems**		
2.	Course code			
3.	Study program	**Intelligent Information Systems**		
4.	Unit offering the course	**FCSE**		
5.	Undergraduate/master/PhD	**Master**		
6.	Year/semester 1/winter/elective	7. ECTS: **6**		
8.	Teacher(s)	Associate professor Andrea Kulakov		
9.	Course prerequisites	None		
10.	Goals (competences): The student will be qualified for modelling and implementation of integrated sensor-robotic systems, especially for integration of wireless sensor networks with robotic systems.			
11.	Course content: Introduction to sensor-robotic systems. Data aggregation and classification in Wireless Sensor Networks. Applying methods of Artificial Intelligence. Systems for data management in Wireless Sensor Networks. Systems for sound processing in sensor networks and robots. Systems for video signal processing in sensor networks and robots. Communication among nodes in the network and the robots. Networked info-mechanical systems. Coverage and exploration during sensor networks deployments. Mobile robots navigation assisted by a sensor network. Task assignment in multi-robot systems negotiated through a sensor network. Coordination and modelling of trust in multi-robot systems. Learning in multi-robot systems. Biologically-inspired robots embedded in the environment. Developmental robotics architectures. Developmental theories and their application in robotics. The feeling of self. Perception. Perception of the objects in the environment. Perception of space. Perception of other agents in the environment. Social learning. Motivations and inner values in autonomous agents.			
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	130 + 0 + 50 = 180 hours		
15.	Teaching activities	15.1.	Lectures	130 hours
		15.2.	Training (labs, problem solving), seminar and team work	0 hours
16.	Other activities	16.1.	Project work	15 hours
		16.2.	Self study	15 hours
		16.3.	Home work	20 hours
17.	Grading			
	17.1.	Tests		25 points
	17.2.	Seminar work/project (written or oral presentation)		65 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)
		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.	S. Thrun, Et Al.	Probabilistic Robotics	MIT Press	2005
2.	E. Bonabeau, Et Al.	Swarm Intelligence: From Natural To Artificial Systems	Kluwer Academic Publishers	1999
3.	L. E. Parker Et Al. (Eds)	Multi-Robot Systems: From Swarms To Intelligent Automata	ISSN 0952- 813X	2005

22.2. Additional

No.	Authors	Title	Publisher	Year
1.	M. A. Batalin	Symbiosis: Cooperative Algorithms For Mobile Robots And A Sensor Network	University Of Southern California	2005
2.	S. Nolfi, D. Floreano	Evolutionary Robotics: The Biology, Intelligence, And Technology Of Self-Organizing Machines		2004
3.	R. Pfeifer, J. Bongard	How The Body Shapes The Way We Think: A New View Of Intelligence	MIT Press	2006