1.	Course title	Robotics
2.	Course code	CSES626
3.	Study program	
4.	Unit offering the course	**FCSE**
5.	Undergraduate/postgraduate/PhD	**Undergraduate**
6.	Year/semester 4/1	7. ECTS: **6**
8.	Teacher(s)	Assoc. prof Andrea Kulakov, PhD, Assist. prof Nevena Ackovska, PhD
9.	Course prerequisites	Artificial intelligence

10.	Goals (competences):
	Students will learn about the intelligent robotics. They will be introduced to the basic techniques for modelling environment, the robot-environment interaction, as well as for modelling human - robot interaction. Students will implement probabilistic models of localization and mapping. Students will implement of video and audio systems and their control. Students will be introduced to behavior based robotics and robots that learn from the environment.

11.	Course content:
	Concept of a robot. Definitions. Direct and inverse kinematics. Dynamics. Artificial limbs. Walking robots. Mobile robots. Sensing and sensors. Robot vision. Robot speech. Space perception, environment learning. Robots behavior. Learning agents. Modeling robot – environment interaction. Localization. Kalman filters. Particle filters. Searching using A*. PID control and other robot control. Simultaneous localization and mapping. Optimization using dynamic programming. Multi- robot systems. Biology inspired robots.

12.	Teaching methods: Lectures, exercises, self-study, projects, seminar thesis		
13.	Total available time	6 ECTS x 25 hours = 150 hours	
14.	Distribution of the available time	30+45+20+15+40 = 150 hours	

15.	Teaching activities	15.1.	Lectures	30 hours
		15.2.	Exercises (labs, problem solving), seminar and team work	45 hours
16.	Other activities	16.1.	Project work	20 hours
		16.2.	Self-study	15 hours
		16.3.	Home work	40 hours

17.	Grading		
	17.1.	Tests	70 points
	17.2.	Seminar work/project (written or oral presentation)	20 points
	17.3.	Active participation	10 points
18.	Grading criteria	to 50 points	5 (five) (F)
		from 51 to 60 points	6 (six) (E)
		from 61 to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)

		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	Final exam prerequisites	Completed activities 15 and 16	
20.	Course language	Macedonian and English	
21.	Quality assurance methods	Internal evaluation and satisfaction polls	

22.	Literature					
	22.1.	Mandatory				
		No.	Authors	Title	Publisher	Year
		1.	Sebastian Thrun et all.	Probabilistic Robotics	MIT Press	2006
	22.2.	Additional literature				
		No.	Authors	Title	Publisher	Year
		1.	Reza N. Jazar	Theory Of Applied Robotics	Springer	2007
		2.	Maja Mataric	The Robotics Primer	MIT Press	2007