

1.	Course title	Mathematical Methods in Robotics		
2.	Course code	InIS-I-05		
3.	Study program	Intelligent Systems Engineering		
4.	Unit offering the course	FCSE		
5.	Undergraduate/master/PhD	Master		
6.	Year/semester 1(2)/summer/elective	7. ECTS: 6		
8.	Teacher(s)	Associate Professor Marija Mihova, Phd		
9.	Course prerequisites	None		
10.	Goals (competences): The students have to learn some mathematical models and for describing the robot movements, through different mathematical fields ad methods.			
11.	Course content: Some selected applications of mathematical modeling methods as geometric reasoning, topological reasoning and logical reasoning in robotics. Polynomial interpolation and approximation, nonlinear equations, approximation with orthogonal functions (Fourier series), optimization, calculation geometry, differential geometry.			
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	30 + 15 + 135 = 180 hours		
15.	Teaching activities	15.1.	Lectures	30 hours
		15.2.	Training (labs, problem solving), seminar and team work	15 hours
16.	Other activities	16.1.	Project work	60 hours
		16.2.	Self study	25 hours
		16.3.	Home work	50 hours
17.	Grading			
	17.1.	Tests		45 points
	17.2.	Seminar work/project (written or oral presentation)		45 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.	J.M. Selig Paperba	Geometric Fundamentals of Robotics (Monograph)	Springer.	2010
		2.	J. David Logan	Applied Mathematics	John Wiley & Sons	2006
	22.2.	Additional				
		No.	Authors	Title	Publisher	Year
1.		Mark de Berg, Otfried Cheong, Marc van Kreveld, Mark Overmars	Computational Geometry: Algorithms and Applications.	Springer	2008	