Add. 3	**Course program for the first, second and third level (cycle) of studies**

1.	Course title	Virtual modeling and simulation				
2.	Code	114				
3.	Study group(s)	IND				
4.	The organizer of the study programme (unit, institute, department)	Faculty of Mechanical Engineering - Skopje, Ss. Cyril and Methodius University in Skopje				
5.	Level (first, second, third)	First				
6.	Academic year / semester	III / VI (summer)	7.	ECTS credits	6	
8.	Instructor	Dr. Igor Gjurkov, associate professor				
9.	Prerequisites	Discrete mathematics Computer-aided design				
10.	Course objectives (competences): Modeling, simulation and analysis of mathematical and virtual mechanical models of technical systems. Evaluation of the behavior and the stability of the systems via model analysis. Multi-parameter optimization of virtual mechanical systems' operation.					
11.	Course content: Introduction of the modeling and simulation method for mechanical system analysis. Dynamic models of mechanical systems (abstract system elements). Mathematical modeling of dynamic models. Simulation and analysis. Stability of systems. Criteria for quality-of-operation and stability evaluation. Virtual mechanical models, MBS approach. Simulation and functional multi-parameter optimization of virtual mechanical models.					
12.	Study methods: lectures, exercises / lab, project, self study					
13.	Total hours	6 ECTS x 30 hours = 180 hours				
14.	Hours allocation per activity:	30 + 30 + 40 + 20 + 60 = 180 hours				

15.	Lectures/Lab	15.1.	Lectures	30 hours
		15.2.	Lab (student work)	30 hours
16.	Project Work/Assignments	16.1.	Project assignments	40 hours
		16.2.	Individual assignments	20 hours
		16.3.	Self-study	60 hours

17.	Points/Marks:		
	17.1.	Tests	60
	17.2.	Projects	35
	17.3.	Attendance	5

18.	Grading scale	Under 50	5 (five) (F)
		51 - 60 points	6 (six) (E)
		61 - 70 points	7 (seven) (D)
		71 - 80 points	8 (eight) (C)
		81 - 90 points	9 (nine) (B)
		91 - 100 points	10 (ten) (A)

19.	Prerequisites for taking the final exam	completed activity 16.1
20.	Language of Instruction	Macedonian
21.	Course evaluation	Student questionnaire

22. Textbooks

22.1. Instruction materials

No.	Author	Title	Publisher	Year
1.	Igor Gjurkov	Virtual modeling and simulation (in Macedonian)	Lecture notes, MFS	2010
2.	W.J. Palm	Modeling, analysis and	John Wiley	2000

				control of dynamic systems	and Sons Inc., New York	
		3.	M. Schaefer	Computational engineering	Springer, Berlin	2006
	22.2.	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	L.G. Birta, G. Arbez	Modeling and simulation	Springer, London	2007