Annex No. 3		**First Cycle Studies Course Programme**			
1.	Course Title	Operational Research and Machine Learning for Management			
2.	Code	MGT 450			
3.	Study programme	Management and Entrepreneurship			
4.	Organizer of the study programme (university unit i.e. institute, chair, department)	Ss. Cyril and Methodius University in Skopje Faculty of Economics - Skopje Chair of Management			
5.	Level (first, second, third cycle)	First cycle			
6.	Academic year / semester	2022-2023 7th (winter semester)	7.	Number of ECTS credits	7.5
8.	Professor	Prof. Violeta Cvetkoska, PhD			
9.	Preconditions for enrolment	None			
10.	**Course Objectives (Competencies):** After taking this course, students should be able to: 1. Use popular operational research and machine learning methods and techniques to model and solve real-world business problems. 2. Solve built models competently using software tools. 3. Analyze and interpret the obtained results, as well as to communicate with the team. 4. Address complicated real-world problems by making better and faster decisions.				
11.	Course content: The purpose of this course is to provide students with the knowledge and skills to model complex real-world problems that companies encounter and their solutions using modern scientific methods and techniques for better decision-making - operational research and machine learning. Students will work on a variety of problem-solving activities and use cutting-edge software to complete them. Special attention will be placed on the analysis of the obtained results and their implementation in a real-world business context in order to make decisions that will help firms enhance their performance and gain a competitive advantage.				
12.	Learning methods: Lectures with PowerPoint presentations and videos; laboratory exercises; quizzes; teamwork; guest lectures; case studies; project assignment preparation and presentation				
13.	Total hours	7.5 ECTS x 30 classes = 225 classes			
14.	Allocation of hours per activity	90+30+15+90= 225 classes			
15.	Types of teaching activates	15.1.	Lectures	90 classes	
		15.2.	Exercises (Seminars)	/	
16.	Other types of activities	16.1.	Projects	30 classes	
		16.2.	Writing Assignments	15 classes	
		16.3	Homework	90 classes	
17.	Grading method: 70+20+10=100 points				
	17.1.	Tests		70%	
	17.2.	Individual or Group Assessment / projects (Presentation: oral and written)		20%	
	17.3.	Attendance and class participations		10%	
18.	Grading scale		less than 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.	Preconditions for taking the final exam		Realized activities from points 15 and 16	
20.	Language		Macedonian (or English)	
21.	Evaluation method		Internal evaluation and survey	
22.	Literature			

		Compulsory literature			
		No.	Author	Title	Publisher	Year
	22.1.	1.	Цветкоска, В.	Операциони истражувања	In preparation	2022
		2.	Цветкоска, В.	Квантитативна анализа за бизнис и економија (моделски пристап со табеларни пресметки и софтвери), Збирка задачи	Стоби Трејд ДООЕЛ	2019

		Additional literature			
		No.	Author	Title	Publisher	Year
	22.2.	1.	Hillier, F. and Hillier, M.	Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets, 6th ed.	Mc-Graw Hill Education	2018
		2.	Shalev-Shwartz and Ben-David	Understanding Machine Learning: From Theory to Algorithms	Cambridge University Press	2014