Attachment no. 3		Course program of the first, second and third cycle of studies			
1.	Course title	**ADVANCED INFORMATION TECHNOLOGY IN DATA ANALYSIS**			
2.	Code	**ITHN -18**			
3.	Study program	***Innovative technologies for food and nutrition***			
4.	The organizer of the study program (unit of management, institute, department)	Faculty of Technology and Technical Sciences Veles "St. Kliment Ohridski" University - Bitola			
5.	Degree	Doctoral studies cycle			
6.	Academic year / semester	1 / II	7.	Number of ECTS credits	5
8.	Teacher	Docent Sasko Martinovski, PhD Docent Vesna Antoska Knights, PhD			
9.	Prerequisites for enrolling the subject	Master studies			
10.	Objectives of the course program (competences): The goal is for them to understand the importance of efficient, scalable and flexible data analysis. Students gain the basic knowledge of the multidimensional view of advanced data analysis, databases, data warehouses and advanced data types, and to understand the functionalities of advanced search, which include: characterization and delimitation; frequency forms; associations and correlations; classification and regression; cluster analysis; and detection of unusual data. Students apply the methodologies of data mining that today has a very successful application in business intelligence, web search, bioinformatics, informatics, finance, digital libraries and digital governments, in nutrition, medicine, biotechnology and in innovative technologies for healthy and safe food.				
11.	Course content: Methods of advanced data analysis, data types and data reprocessing. Basics of databases. An introduction to the design of databases. Basics of the relational data model with a brief overview of data models, defining a relational schema in SQL and simple queries in SQL. Basic concepts of data warehouses. Difference between database and data warehouse. Basic concepts of the mining of frequency forms, association and correlation. Classification. Basic concepts, decision trees, Bayes method of classification, models of evaluation and selection. Cluster analysis. Methods of cluster analysis and evaluation of clustering. Trends and active research areas of data mining. Mining of sequential data such as biological sequences. Active application of data mining in science and engineering, bioinformatics, finance and business intelligence. Practical work in Weka - application for data mining with examples of Nutrition and innovative technologies for healthy and safe food. Performing operations in Weka such as noise delays and inconsistent data, data merge, selection, transformation, a process where intelligent methods are used to extract data formats, visualization and techniques for presenting knowledge.				

12.	Learning methods:			
13.	Total available time		150 hours	
14.	Distribution of the available time		30+30+30+60=150	
15.	Forms of teaching activities	15.1.	Lectures - theoretical teaching	30 hours
		15.2.	Exercises (laboratory, auditory), seminars, teamwork	30 hours
16.	Other forms of activity	16.1.	Project tasks	30 hours
		16.2.	Independent tasks	60 hours
		16.3.	Home learning	hours
17.	Method of assessment			
	17.1.	Tests		points
	17.2.	Seminar work / project (presentation: written and oral)		90 points
	17.3.	Activity and participation		10 points
18.	Grading criteria (points / grade)		to 50 points	5 (five) (F)
			from 51 to 60 бода	6 (six) (E)
			from 61 to 70 бода	7 (seven) (D)
			from 71 to 80 бода	8 (eight) (C)
			from 81 to 90 бода	9 (nine) (B)
			from 91 to 100 бода	10 (ten) (A)
19.	Requirement for signature and taking the final exam			
20.	Language of teaching		Macedonian	
21.	Method of monitoring the quality of teaching			

22.	Literature					
		Compulsory literature				
		Item number	Autor	Title	Publisher	Year
	22.1.	1.	Jiawei Han, Micheline Kamber, Jian Pei	Data mining: Methods and Models Third Edition	Morgan Kaufmann is an imprint of Elsevier	2012
		2.	Хектор Гарсија-Молина, Џефри Д. Улман,Џенифер Видом	Системи за бази на податоци	Арс Ламина ДОО	2010
		3.	Remco R. Bouckaert, Eibe Frank, Mark Hall, Richard Kirkby, Peter Reutemann, Alex Seewald, David Scuse,	Weka Manual	University of Waikato, Hamilton, New Zealand	2008
		Additional literature				
		Item number	Autor	Title	Publisher	Year
		1.	Daniel T. Larose	Data mining	John Wiley &	2006

22.2.			Methods and Models	Sons, Inc., Hoboken, New Jersey.	
	2.	Pang-Ning Tan, Michael Steinbach, Vipin Kumar	Introduction to Data Mining	Addison-Wesley; 1 edition	2005
	3.	Ramakrishnan, Gehrke	Системи за управување со бази на податоци Трето издание	Абакус процес, Скопје	2009