1.	Course Title	Data Warehouses and OLAP		
2.	Code	F18L3S157		
3.	Study program	Software engineering and information systems		
4.	Study Program Organizer	Faculty of Computer Science and Engineering		
5.	Degree (first, second, third cycle)	first cycle		
6.	Academic year / semester 4 / summer / mandatory	7. ECTS credits 6		
8.	Teacher	full professor Goran Velinov, assistant professor Eftim Zdravevski		
9.	Course enrollment prerequisites	Бази на податоци		
10.	Course program goals (competencies): Introduction to organization and manipulation of data organized in data warehouses, as well as basic operations and algorithms for working with data warehouses. The student will be capable to model data warehouses, to organize and manipulate with data stored in data warehouses, to prepare analytic reports based on the same data.			
11.	Course program content: Basic concepts of data warehouses; Data warehouse architecture; Data flow in data warehouses; Modelling data warehouses; Organization of data in star schema in data warehouse; Organization of data in snowflake schema in data warehouse; Hypercubes and multidimensional databases; Technologies for data online analytical processing (OLAP); Expanding SQL standard for OLAP needs; Connection between operational databases and data warehouses; Automatic data updating in data warehouses, data cleansing and data aggregation (ETL processes); Organization in distributed data warehouses; Analysis of very large data; The practical implementation will include study of leading tools and technologies in data warehouses.			
12.	Learning methods: Lectures using presentations, interactive lectures, exercises (using equipment and software packages), teamwork, case studies, invited guest lecturers, independent preparation and defense of a project assignment and seminar work.			
13.	Total available time	6 ECTS x 30 hours = 180 hours		
14.	Distribution of the available time	30 + 45 + 15 + 15 + 75 = 180 hours		
15.	Teaching activity forms	15.1.	Lectures – theoretical teaching	30 hours

		15.2.	Exercises (laboratory, auditory), seminar papers, teamwork	45 hours
16.	Other activity forms	16.1.	Project Tasks	15 hours
		16.2.	Independent Learning Tasks	15 hours
		16.3.	Home learning	75 hours

17.	Assessment methodology		
	17.1.	Tests	10 points
	17.2.	Seminar paper/project (presentation: written and oral)	10 points
	17.3.	Activity and learning	10 points
	17.4.	Final exam	70 points

18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)
		51 to 60 points	6 (six) (E)
		61 to 70 points	7 (seven) (D)
		71 to 80 points	8 (eight) (C)
		81 to 90 points	9 (nine) (B)
		91 to 100 points	10 (ten) (A)
19.	Course completion and final exam requirements	Realized activities 15.1 and 15.2	
20.	Teaching Language	Macedonian and English	
21.	Teaching quality evaluation method	Internal evaluation mechanisms and questionnaires	
22.	Course Material		
	22.1.	Mandatory course material	

	No.	Author	Title	Publisher	Year
	1	Jarke, M., Lenzerini, M., Vassiliou, Y., Vassiliadis, P.	Fundamentals of Data Warehouses	Спрингер	2013
	2	Robert Wrembel and Christian Koncilia	Data Warehouses and Olap: Concepts, Architectures and Solutions	IGI Global	2007
	3	M. Golfarelli, S. Rizzi	Data Warehouse Design: Modern Principles and Methodologies	McGraw-Hill	2009

22.2. Additional course material

No.	Author	Title	Publisher	Year