1.	Course Title	Non-relational databases
2.	Code	F18L3S141
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 / optional	7. ECTS credits 6
8.	Teacher	full professor Goran Velinov, associate professor Slobodan Kalajdzhiski, assistant professor Eftim Zdravevski
9.	Course enrollment prerequisites	Бази на податоци
10.	Course program goals (competencies): The aim of the course is to familiarize students with unstructured and semi-structured data types, their organization and storage, as well as techniques for manipulating and processing them. Students will be also familiar with NoSQL databases, modern databases that don't rely on the relational model, which are used in distributed and clustered environments. Special emphasis will be put on the practical knowledge of some of the available NoSQL databases.	
11.	Course program content: Introduction to semi-structured data. ObjectExchangeModel (OEM). Introduction to XML. Structure of XML documents. XML data Schemas (DTD and XMLSchema). Recommendations for the transformation of EER models into XML data schemas. Traversal of the XML documents: by using xPath to navigate through XML documents, and manipulating XML documents through XQuery. Writing simple queries and using user-defined functions. Introduction to NoSQL databases. Introduction with the way of structuring, storing and manipulating data organized through the NoSQL databases. The most commonly used NoSQL databases and their application in different domains and applications. Unstructured databases. Analysis and combination of unstructured and structured data. Metadata for unstructured data. Methodology for textual analysis.	
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)	40 points
	17.3.	Activity and learning	10 points
	17.4.	Final exam	40 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	Martin Fowler	NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence	Addison-Wesley Professional	2012
2	A. Moller and M. Schwartzbach	An Introduction to XML and Web Technologies	Addison Wesley	2006
3	D. Hunter, J. Rafter, J. Fawcett, E. van der Vlist, D. Ayers, J. Duckett, A. Watt, L. McKinnon	Beginning XML, 4th Edition (Programmer to Programmer)	Wrox	2007
4	E. Redmond, J. R. Wilson	Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement	Pragmatic Bookshelf	2012
5	Guy Harrison	Next Generation Databases: NoSQLand Big Data	Apress	2015

22.2.	Additional course material			
	No.	Author	Title	Publisher	Year