



POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

1. GENERAL COURSE INFORMATION

1.1 Course name	Databases I			
1.2 Study program/s	Undergraduate professional study of Computer Science			
1.3 Course status (M,E)	Mandatory	1.6 Mode of instruction (number of hours)	Lectures	30
1.4 Course code			Exercises	30
1.5 Course abbreviation	PB1		Seminars	
1.6 Semester	IV		E-learning	
1.7 ECTS	5	1.7 Place and time of instruction	Premises of the Polytechnic of Međimurje in Čakovec, according to the schedule published on the website	

2. TEACHING STAFF

2.1 Course leader/s-title	Željko Knok/ Master of Science	contact	zknok@mev.hr
		contact	
2.2 Assistant/s- title		contact	
		contact	
2.3 Instruction held by- title		contact	

3. COURSE DESCRIPTION

3.1 Course goals	The student will be able to manage the database after completing the course. Knowledge is acquired in the field of database, SQL query language and the capabilities and role of information retrieval systems in the information system.									
3.2 Prerequisites	To take the course it is necessary to pass the course Algorithms and Data Structures									
3.3 Course outcomes	After successfully completing the course, students will be able to: O1 - Create basic queries in SQL language independently O2 - Link multiple data tables using SQL queries O3 - Design and optimize a normalized database using indexes O4 - Create a simple database									
3.4 Course content	The course presents contents related to the concept, possibilities and role of the database. Special attention is given to data search using SQL language, modeling and database maintenance. In the practical part, open source tools are used.									
3.5 Types of coursework	x	Lectures	x	Exercises		Blended e-learning	x	Individual activities		Laboratory
		Seminars and workshops		Distant learning		Field classes	x	Multimedia and network		Mentorship
		Other								
3.6 Language of instruction	Croatian /English									
3.7 Monitoring students' work (enter the	1,00	Class attendance				Seminars				Essay
	1,00	Class activity				Project				Report/paper

number of ECTS credits for each activity so that the total number of ECTS credits is equal to the total ECTS value of the course, 1 ECTS = 30 hours)	1,00	Midterm exams	1,00	Practical task	1,00	Continuous knowledge check																																																								
		Written exam		Experimental work																																																										
		Oral exam		Research																																																										
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	3.10 Specific features related with taking the course	<p>If a student collects 50% of the points of each outcome, he / she directly takes the exam, provided that he / she has done practical work (exercises). A student cannot access the exam period if he / she has not achieved min. 60% correct answers. Practical work-exercises are made according to the instructions published on the Merlin system and are submitted by posting on the Merlin. Checking the completed exercises is done in the exercise classes after prior preparation with the teacher. During the semester, the student is required to perform five exercises independently. Practical work (completed exercises) is taught until the last week of lectures. During the exam, it is possible to orally check the knowledge from practical work (exercises).</p> <p>If a student does not achieve a sufficient number of points on the midterm exam, he / she cannot take the next midterm exam.</p> <p>Once achieved points in intermediate exams for each learning outcome are no longer deleted unless the student decides to correct the result for each learning outcome, whereby the points won until then are deleted and newly achieved points for that learning outcome are entered.</p>																																																												

	<p>The final grade is obtained on the exam period and is the sum of points earned during classes.</p> <p>Students who did not take the colloquium access the written part of the exam where all learning outcomes are checked, and are required to have completed exercises before taking the exam.</p>	
3.11 Students obligations	<p>Full-time students are required to attend at least 70% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. Part-time students are required to attend at least 30% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. If the student has not fulfilled all the obligations set by the course, he is obliged to attend the lectures again and meet the conditions for taking the exam.</p> <p>Attendance can be offset by online tuition, organised webinars and added assignments given by teachers. One lesson lasts 45 minutes, and several hours form a teaching unit. Absence from one teaching unit is counted as one absence. Delays and apologies are recorded separately. In that case, if the student missed more than 50% of classes, and has a justifiable reason/apology, the request should be submitted to the Department Council, which then decides on the justification of student absences with the obligatory opinion of the course leader.</p>	
3.12 Written assignments		
3.13 Required reading	1.	Abraham Silberschatz: DATABASE SYSTEM CONCEPTS SIXTH EDITION, 201
	2.	
3.14 Additional reading	1.	
	2.	
4 ADDITIONAL COURSE INFORMATION		
4.1 Quality control	<p>The quality of the program, teaching process, teaching skills and level of mastery of the material will be established by conducting a written evaluation based on questionnaires, and in other standardised ways and in accordance with the by-laws of the Polytechnic of Međimurje in Čakovec.</p>	
4.2 Contact the teacher	<p>Students can contact the teacher during the office hours and during classes, while for short questions and explanations they can contact him/her any day during working hours by coming in person or by landline. It is also possible to ask questions by e-mail, which will be answered in 48 hours at the latest. It is desirable for students to come as often as possible for any possible questions during the teacher's office hours.</p>	
4.3 Information about the course	<p>It is the obligation of each student to be regularly informed about the course. All notifications about the classes or possible postponement of classes will be posted on the bulletin board and on the website of the Polytechnic at least 24 hours in advance.</p>	

4.4 Course contribution to the study program	<p>Use English in the domain of ICT in communication with experts and lay people.</p> <p>Apply database basics through database creation, modeling and administration.</p> <p>Develop web and mobile projects, applying advanced technologies and connecting to databases using modern methods and tools</p>
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5. ANALYSIS OF COURSE TOPICS (the number of hours is equal to the number of lectures and exercises of the course)

LECTURES				
Week	Topic and description	Method	Learning outcomes	Course outcome
		<ul style="list-style-type: none"> • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes... 		
1.	Introduction to course content, basics in database design, primary and foreign key	Direct teaching (lecture, instruction, pp presentation)	Distinguish between relational and non-relational databases	O1
2.	Data types, model, normalization	Direct teaching (lecture, instruction, pp presentation)	Distinguish between different data types and database models	O1
3.	Basic DDL and DML commands	Direct teaching (lecture, instruction, pp presentation)	Distinguish commands for working with databases	O2
4.	String, date and aggregate functions, Null values	Direct teaching (lecture, instruction, pp presentation)	Use different functions when creating queries	O2
5.	Cartesian product, natural fusion	Direct teaching (lecture, instruction, pp presentation)	Distinguish the types of queries according to the set conditions	O2
6.	Join, types of mergers	Direct teaching (lecture, instruction, pp presentation)	Distinguish ways to create queries using the Join function	O2
7.	Aliases, aliases for individual database elements	Direct teaching (lecture, instruction, pp presentation)	Use Aliases when creating queries	O2
8.	Mid-term exam 1			O1-O2
9.	Group by, having functions	Direct teaching (lecture, instruction, pp presentation)	Apply basic syntax for aggregate and scalar functions	O3
10.	Subqueries	Direct teaching (lecture, instruction, pp presentation)	Apply and distinguish basic	O3

			syntax for subqueries	
11.	Keys, indexes, full text index	Direct teaching (lecture, instruction, pp presentation)	Explain the types of keys and indexes	O3
12.	Query optimization	Direct teaching (lecture, instruction, pp presentation)	Explain the concept of optimization	O4
13.	Backing up and restoring the database	Direct teaching (lecture, instruction, pp presentation)	Explain the process of backing up Databases	O4
14.	Work with other databases and tools	Direct teaching (lecture, instruction, pp presentation)	Explain distributed and undistributed DB, and NoSql databases	O4
15.	Mid-term exam 2			O3-O4
EXERCISES/ SEMINARS				
Week	Topic and description	Method <ul style="list-style-type: none"> • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes... 	Learning outcomes	Course outcome
1.	Basic data types and software installation	Direct teaching (lecture, instruction, pp presentation)	Explain the installation procedure and application of basic data types	O1
2.	Data types and where functions	Guided task, code examples	Apply basic data types when creating a simple query	O1
3.	Data type, date, null and clause order by	Guided task, code examples	Apply date type data and data with null values when creating queries	O1
4.	Exercise 1	Independent preparation of the exercise	Create queries over the workshop database with basic commands and data types	O1
5.	Cartesian product and natural compound	Guided task, code examples	Explain the role and significance for the construction of queries of the mentioned terms	O2
6.	Exercise 2	Independent preparation of the exercise	Make more complex queries using a natural	O2

			compound and a Cartesian product	
7.	Merge tables using the join function	Guided task, code examples	Apply basic join syntax	O2
8.	Exercise 3	Independent preparation of the exercise	Create queries using the join function	O2
9.	Possibilities of alias	Guided task, code examples	Design queries by applying aliases to different DB elements	O2
10.	Exercise 4	Independent preparation of the exercise	Apply aliases to the basic elements of DB	O3
11.	Aggregate and scalar functions	Guided task, code examples	Explain the ways of applying aggregate and scalar functions	O3
12.	Exercise 5	Independent preparation of the exercise	Build queries using aggregate and scalar functions	O3
13.	Subquery and database models	Guided task, code examples	Create queries using subqueries and build DB models	O4
14.	Exercise 6	Independent preparation of the exercise	Create queries with subqueries and create a simple DB	O4
15.	Different types of databases	Direct teaching (lecture, instruction, pp presentation)	Explain the different types of databases	O4