

Course Name : Database Management Systems							
Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
CMP 402	B	Spring	3.00	1.00	0.00	3.50	6.00
<b>Lecturer</b> Eris Zeqo, PhD							
<b>Assistant</b> Sofokli Garo, PhD							
<b>Course language</b> Albanian							
<b>Course level</b> Master							
<b>Description</b> The course "Database Management Systems" focuses on the theoretical and practical principles of designing, developing, and managing database systems. It covers data models, SQL, normalization, indexing, transactions, concurrency control, and recovery management.							
<b>Objectives</b> To understand basic database concepts and DBMS architecture. To effectively use SQL for data manipulation and querying. To apply normalization for efficient schema design. To understand transaction mechanisms and concurrency control. To analyze performance and indexing structures.							
<b>Core Concepts</b> Relational models and data schemas Data manipulation languages (SQL, DDL, DML) Normalization and conceptual/logical design Transactions and ACID properties Indexing, query optimization, and recovery							
Course Outline							
Week	Topic						
1	- Extended entity relationship model (EER model) - Entity clusters - Using them to represent multiple entities and relationships						
2	- Convenient primary key features - How to select these keys - Use of flexible solutions for special cases of data modeling						
3	- Relational operators UNION, UNION ALL, INTERSECT and MINUS - How to use JOIN advanced SQL syntax - Different types of subquery and related query						
4	- SQL functions - Using them to manipulate dates, texts and other data - Create and use updatable views						
5	- Triggers and stored procedures - Their creation and use - Creating embedded SQL						
6	- Exercises in SQL - Practical examples						
7	- Project I						
8	- Adapting the design of the database to the information system where it belongs - Systems Development Life Cycle (SDLC) - Development of information systems within the framework of SDLC						
9	- Evaluate and review databases in the Database Life Cycle (DBLC) framework - How the evaluation and review is performed within the SDLC and DBLC frameworks - Database design strategies						
10	- Basic concepts for regulating database performance (tuning) - How DBMS processes SQL queries - The importance of indexes in processing SQL code						
11	- Types of decisions a query optimizer should make - Common Practices for Writing Efficient SQL Code - How to formulate queries and adjust the DBMS for optimal performance						
12	- Various technologies to connect to the database - Using intermediaries to integrate databases with the Internet - Plug-ins and extensions for browsers						

<b>13</b>	- Services provided by Web application servers - What is XML and its importance in the development of Web databases - Cloud services features
<b>14</b>	- SQL data services and the impact on reducing costs for data management - Exercises
<b>15</b>	- Project II
<b>16</b>	Final Exam
<b>Prerequisites</b>	The student must attend the course at a minimum rate of 75%.
<b>Literature</b>	<ul style="list-style-type: none"> <li>Abraham Silberschatz, Henry F. Korth, S. Sudarshan - Database System Concepts, 7th Edition, McGraw-Hill, 2020.</li> </ul>
<b>References</b>	<ul style="list-style-type: none"> <li>Ramez Elmasri &amp; Shamkant B. Navathe - Fundamentals of Database Systems, 7th Edition, Pearson, 2017.</li> <li>C.J. Date - An Introduction to Database Systems, 8th Edition, Pearson, 2004.</li> <li>Raghu Ramakrishnan &amp; Johannes Gehrke - Database Management Systems, 3rd Edition, McGraw-Hill, 2003.</li> </ul>
<b>Course Outcome</b>	
<b>1</b>	Students will master database systems concepts and structures.
<b>2</b>	They will be able to create, normalize, and manipulate data using SQL.
<b>3</b>	They will understand transaction management and concurrency challenges.
<b>4</b>	They will evaluate system performance and proper indexing strategies.

<b>Course Evaluation</b>			
<b>In-term Studies</b>	<b>Quantity</b>	<b>Percentage</b>	
Midterms	0	0	
Quizzes	0	0	
Projects	1	30	
Term Projects	0	0	
Laboratory	0	0	
Class Participation	0	0	
<b>Total in-term evaluation percent</b>		<b>30</b>	
<b>Final exam percent</b>		<b>70</b>	
<b>Total</b>		<b>100</b>	
<b>ECTS Workload (Based on Student Workload)</b>			
<b>Activities</b>	<b>Quantity</b>	<b>Duration (hours)</b>	<b>Total (hours)</b>
Course duration (Including the exam week: 16x Total hours of the course)	16	4	64
Study hours outside the classroom (Preparation, Practice, etc.)	14	3	42
Duties	1	40	40
Midterms	0	0	0
Final Exam	1	4	4
Other	0	0	0
<b>Total Work Load</b>			<b>150</b>
<b>Total Work Load / 25 (hours)</b>			<b>6.00</b>
<b>ECTS</b>			<b>6.00</b>