

## SYLLABUS

### 1. Information regarding the programme

1.1 Higher education institution	<b>Babeş Bolyai University, Cluj-Napoca</b>
1.2 Faculty	<b>Faculty of Mathematics and Computer Science</b>
1.3 Department	<b>Department of Computer Science</b>
1.4 Field of study	<b>Computer Science</b>
1.5 Study cycle	<b>Bachelor</b>
1.6 Study programme / Qualification	<b>Computer Science</b>

### 2. Information regarding the discipline

2.1 Name of the discipline	<b>Database Management Systems</b>						
2.2 Course coordinator	<b>Lect. Dr. Sabina Surdu</b>						
2.3 Seminar coordinator	<b>Lect. Dr. Sabina Surdu</b>						
2.4. Year of study	<b>2</b>	2.5 Semester	<b>4</b>	2.6. Type of evaluation	<b>C</b>	2.7 Type of discipline	<b>Compulsory</b>
2.8. Code of the discipline	MLE5028						

### 3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					25
Additional documentation (in libraries, on electronic platforms, field documentation)					15
Preparation for seminars/labs, homework, papers, portfolios and essays					25
Tutorship					11
Evaluations					18
Other activities: .....					
3.7 Total individual study hours	94				
3.8 Total hours per semester	150				
3.9 Number of ECTS credits	6				

### 4. Prerequisites (if necessary)

4.1. curriculum	Data structures and algorithms Fundamental database concepts
4.2. competencies	Average programming skills in a high level programming language

### 5. Conditions (if necessary)

5.1. for the course	Lecture room with a video projector
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5.2. for the seminar /lab activities	Lab room with SQL Server, Visual Studio
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## 6. Specific competencies acquired

<b>Professional competencies</b>	<p>C 5.3 Using methodologies and database design environments for specific problems</p> <p>C 5.4 Evaluating the quality of various Database Management Systems in terms of their structure, functionality and extensibility</p> <p>C 5.5 Developing projects involving databases</p>
<b>Transversal competencies</b>	<p>CT1 - Applying organized and efficient work rules, responsible attitudes towards the didactic and scientific field, in order to creatively capitalize on one's own potential, while respecting the professional ethics principles and rules</p> <p>CT3 - Use efficient methods and techniques for learning, knowledge gaining, researching and developing abilities for knowledge capitalization and accommodation to the requirements of a dynamic society</p>

## 7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	<ul style="list-style-type: none"> <li>To get acquainted with the fundamental concepts concerning concurrency control, database recovery, distributed databases, database security</li> </ul>
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> <li>To create ADO.NET applications with data-bound controls</li> <li>To handle concurrently running transactions using pessimistic and optimistic isolation levels</li> <li>To optimise SQL queries</li> </ul>

## 8. Content

8.1 Course	Teaching methods	Remarks
<b>1. Introduction</b>	Interactive presentation Conversation Examples Explanation	
<b>2. Transactions, Concurrency Control</b>	Interactive presentation Conversation Examples Explanation	
<b>3-4. Data Recovery</b>	Interactive presentation Conversation Examples Explanation	
<b>5. Database Security</b>	Interactive presentation Conversation Examples Explanation	

<b>6-8. Query Optimization</b>	Interactive presentation Conversation Examples Explanation	
<b>9-11. Distributed Databases</b>	Interactive presentation Conversation Examples Explanation	
<b>12. Spatial Databases</b>	Interactive presentation Conversation Examples Explanation	
<b>13. Parallel Databases</b>	Interactive presentation Conversation Examples Explanation	
<b>14. Problems</b>	Interactive presentation Conversation Examples Explanation	

### **Bibliography**

DATE, C.J., An Introduction to Database Systems (8th Edition), Addison-Wesley, 2003  
GARCIA-MOLINA, H., ULLMAN, J., WIDOM, J., Database Systems: The Complete Book, Prentice Hall Press, 2008  
KNUTH, D.E., Tratat de programare a calculatoarelor. Sortare și căutare, Editura Tehnică, București, 1976  
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LIU, L., OZSU, M.T., Encyclopedia of Database Systems, Springer, 2009  
RAMAKRISHNAN, R., GEHRKE, J., Database Management Systems, McGraw-Hill, 2007,  
<http://pages.cs.wisc.edu/~dbbook/openAccess/thirdEdition/slides/slides3ed.html>  
RAMAKRISHNAN, R., GEHRKE, J., Database Management Systems (2nd Edition), McGraw-Hill, 2000  
SILBERSCHATZ, A., KORTH, H., SUDARSHAN, S., Database System Concepts, McGraw-Hill, 2010  
ȚÂMBULEA, L., Curs Baze de date, Facultatea de Matematică și Informatică, UBB, versiunea 2013-2014  
ȚÂMBULEA, L., Baze de date, Litografiat, Cluj-Napoca, 2003  
ULLMAN, J., WIDOM, J., A First Course in Database Systems,  
<http://infolab.stanford.edu/~ullman/fcdb.html>

<b>8.2 Seminar / laboratory</b>	Teaching methods	Remarks
<b>Seminar</b>		
<b>1. ADO.NET (I)</b>	Conversation Problems Examples Explanation	
<b>2. ADO.NET (II)</b>	Conversation Problems Examples Explanation	
<b>3. Transactions, Concurrency Control</b>	Conversation Problems Examples Explanation	

<b>4. Multiversioning</b>	Conversation Problems Examples Explanation	
<b>5. Performance Optimisation in SQL Server (I)</b>	Conversation Problems Examples Explanation	
<b>6. Performance Optimisation in SQL Server (II)</b>	Conversation Problems Examples Explanation	
<b>7. Problems</b>	Conversation Problems Examples Explanation	
<b>Laboratory</b>		
<b>1-2. Windows Forms application using ADO.NET to interact with a SQL Server database</b>	Conversation Problems Examples Explanation	
<b>3. Generic Windows Forms application - configuration file</b>	Conversation Problems Examples Explanation	
<b>4-5. Concurrency control</b>	Conversation Problems Examples Explanation	
<b>6. Concurrency control (II)</b>	Conversation Problems Examples Explanation	
<b>7. Practical exam</b>		
<b>Bibliography</b> Course bibliography		

**9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program**

<ul style="list-style-type: none"> <li>• The course is oriented towards the problems a graduate student should solve at his / her future workplace. The acquired knowledge is considered as mandatory by software companies.</li> <li>• The course is part of the academic curriculum of all major universities in Romania and abroad.</li> <li>• The course structure follows the IEEE and ACM Recommendations concerning the Computer Science curriculum.</li> </ul>
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**10. Evaluation**

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	<ul style="list-style-type: none"> <li>• to know and apply the concepts described at the course</li> <li>• to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>• written exam</li> </ul>	50%

10.5 Seminar/lab activities	<ul style="list-style-type: none"> <li>• to be able to apply the concepts from the course and seminar to create applications that manage databases, to manage concurrent transactions</li> </ul>	<ul style="list-style-type: none"> <li>• lab evaluation</li> <li>• practical exam</li> </ul>	50%
10.6 Minimum performance standards			
<ul style="list-style-type: none"> <li>➤ To pass, a student must get a grade of at least 5 (on a scale of 1 to 10) on the written exam, practical exam and lab evaluation.</li> <li>➤ To attend the exam, a student must have at least 6 laboratory attendances and at least 5 seminar attendances, according to the Computer Science Department's decision: <a href="http://www.cs.ubbcluj.ro/wp-content/uploads/Hotarare-CDI-15.03.2017.pdf">http://www.cs.ubbcluj.ro/wp-content/uploads/Hotarare-CDI-15.03.2017.pdf</a>.</li> </ul>			

Date

22.04.2018

Signature of course coordinator

Lect. Dr. Sabina Surdu

Signature of seminar coordinator

Lect. Dr. Sabina Surdu

Date of approval

Signature of the head of department

Prof. Dr. Anca Andreica