SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	**Babeş Bolyai University**
1.2 Faculty	**Faculty of Mathematics and Computer Science**
1.3 Department	**Department of Computer Science**
1.4 Field of study	**Computer Science**
1.5 Study cycle	**Bachelor**
1.6 Study programme / Qualification	**Computer Science**

2. Information regarding the discipline

2.1 Name of the discipline				**Database Management System**			
2.2 Course coordinator				**Lect. PhD Dan Mircea Suciu**			
2.3 Seminar coordinator				**Lect. PhD Dan Mircea Suciu**			
2.4. Year of study	**2**	2.5 Semester	**1**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**Compulsory**

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	1 sem + 1 lab
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	15
Additional documentation (in libraries, on electronic platforms, field documentation)	10
Preparation for seminars/labs, homework, papers, portfolios and essays	22
Tutorship	3
Evaluations	20
Other activities:	-

3.7 Total individual study hours	70
3.8 Total hours per semester	126
3.9 Number of ECTS credits	6

4. Prerequisites (if necessary)

4.1. curriculum	• Data Structures and Algorithms • Databases Basics
4.2. competencies	• Average programming skills in a high level programming language

5. Conditions (if necessary)

5.1. for the course	•
5.2. for the seminar /lab	• Laboratory with computers with MS SQL Server (minimum 2005)

activities	installed.

6. Specific competencies acquired

Professional competencies	- Knowledge, understanding and use of basic concepts of theoretical Computer Science - Ability to work independently and/or in a team in order to solve problems in defined professional contexts. - Good database design and programming skills
Transversal competencies	- Ability to create SQL transactions and to handle concurrent transactions - Ability to optimize SQL queries - Improved programming abilities

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

7.1 General objective of the discipline	• To get acquainted with the general concepts regarding the databases. • To get acquainted with the data models, especially the relational model.
7.2 Specific objective of the discipline	• To get acquainted with the problems regarding the database security, stored procedures, client-server technology, concurrent access to the databases, database recovery, distributed databases.

8. Content

8.1 Course	Teaching methods	Remarks
1. Transactions. Concurrency control. Execution plan	Exposure: description, explanation, examples, discussion of case studies	
2. Interference anomalies. Serializability	Exposure: description, explanation, examples, discussion of case studies	
3. Concurrency control locking policies: 2PL conservative, 2PL strict.	Exposure: description, explanation, examples, debate, dialogue	
4. Deadlock Management.	Exposure: description, explanation, examples, discussion of case studies	
5. Concurrency control with timestamps. OCC.	Exposure: description, explanation, examples, discussion of case studies	
6. Multi-versioning	Exposure: description, explanation, examples, discussion of case studies	
7. Data recovery.	Exposure: description, explanation, examples, discussion of case studies	
8. Parallel Databases	Exposure: description, explanation, examples, discussion of case studies	

9. Distributed Databases.	Exposure: description, explanation, examples, discussion of case studies	
10. Transaction Management in Distributed Databases.	Exposure: description, explanation, examples, debate, dialogue	
11. Locking Management in Distributed Databases.	Exposure: description, explanation, examples, debate, dialogue	
12. Data Recovery in Distributed Databases.	Exposure: description, explanation, examples, debate, dialogue	
13. Database Security.	Exposure: description, explanation, examples, debate, dialogue	
14. Data Warehouses	Exposure: description, explanation, examples, debate, dialogue	

Bibliography
1. AHO, A., HOPCROFT, J., ULLMAN, J., Data Structures and Algorithms. Addison-Wesley, Reading, Massachusetts, 1983.
2. BÂSCA, O., Baze de date. Editura All, Bucuresti 1997.
3. DATE, C.J., An Introduction to Data Base Systems. Addison Wesley, Reading, MA, 2004.

8.2 Seminar	Teaching methods	Remarks
1. Transactions in MS SQL Server	Dialogue, debate, case studies, examples, proofs	The seminar is structured as 2 hours classes every second week
2. Concurrency control in MS SQL Server	Dialogue, debate, case studies, examples, proofs	
3. Security in MS SQL Server	Dialogue, debate, case studies, examples, proofs	
4. Query optimization in MS SQL Server	Dialogue, debate, case studies, examples, proofs	
5. Database administration	Dialogue, debate, case studies, examples, proofs	
6. Distributed databases specific statements	Dialogue, debate, case studies, examples, proofs	
7. NoSQL Databases	Dialogue, debate, case studies, examples, proofs	

Bibliography

1. KORTH, H.F., SILBERSCHATZ, A., Data Base System Concepts. McGraw-Hill Book Compagny, 1986.
2. LIVIU NEGRESCU, LAVINIA NEGRESCU, Limbajul C# pentru incepatori. Editura Albastra, Cluj-Napoca 2011.
3. RAMAKRISHNAN, R., Database Management Systems. McGraw-Hill, 1998.

8.3 Laboratory	Teaching methods	Remarks
1. + 2. Update .NET application using data source	Explanation, dialogue, case studies	
3. +4. + 5. + 6. Full development in SQL of a database testing environment	Explanation, dialogue, case studies	
6.+7.+8. Transactions management and deadlock simulation	Explanation, dialogue, case studies	
9.+10.+11. SQL queries optimization	Explanation,	

	dialogue, case studies	
12. +13.+14. SQL queries optimization	Testing data discussion, evaluation	

Bibliography

1. KORTH, H.F., SILBERSCHATZ, A., Data Base System Concepts. McGraw-Hill Book Compagny, 1986.
2. LIVIU NEGRESCU, LAVINIA NEGRESCU, Limbajul C# pentru incepatori. Editura Albastra, Cluj-Napoca 2011.
3. RAMAKRISHNAN, R., Database Management Systems. McGraw-Hill, 1998.
4. T. THEMSTROM, A. WEBBER, M. HOTEK, MS SQL Server 2008 - Database Development, Self Paced Training Kit 2009

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

- The course structure is according with the IEEE and ACM Recommendations for Computer Science studies;
- The course is part of the studying program of all major universities in Romania and abroad;
- The content of the course is considered by the software companies as mandatory knowledge for a senior level software developer

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	- know the basic principle of the domain; - apply the course concepts - problem solving	Written exam	50%
10.5 Seminar/lab activities	- be able to create an SQL script for tables maintenance - be able to detect optimization problems in SQL queries	- Practical examination - Continuous observations	50%
10.6 Minimum performance standards			
➢ The final grade (average between written exam and laboratory work) should be at least grade 5 (from a scale of 1 to 10)			

Date	Signature of course coordinator	Signature of seminar coordinator
....	Lect. PhD. Dan Mircea Suciu	Lect. PhD. Dan Mircea Suciu

Date of approval   Signature of the head of department

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