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	**Computers and Information Technology**
1.5 Study cycle	**Bachelor**
1.6 Study programme / Qualification	**Information Engineering**

2. Information regarding the discipline

2.1 Name of the discipline (en) (ro)			**Databases 2**				
2.2 Course coordinator			**Lect. Dr. Sabina Surdu**				
2.3 Seminar coordinator			**Lect. Dr. Sabina Surdu**				
2.4. Year of study	**2**	2.5 Semester	**4**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**Compulsory DD**
2.8 Code of the discipline		MLE5174					

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 S 1 LP
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					10
Additional documentation (in libraries, on electronic platforms, field documentation)					10
Preparation for seminars/labs, homework, papers, portfolios and essays					10
Tutorship					7
Evaluations					7
Other activities:					

3.7 Total individual study hours	44
3.8 Total hours per semester	100
3.9 Number of ECTS credits	4

4. Prerequisites (if necessary)

4.1. curriculum	• Data Structures and Algorithms • Databases

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
5.2. for the seminar /lab activities	• Lab room with a video projector, SQL Server, Visual Studio

6. Specific competencies acquired

Professional competencies	C1.5 Providing theoretical background for the characteristics of the designed systems C2.1 Describing the structure and operation of hardware, software and communication components C2.2 Explaining the role, interaction and operation of hardware, software and communication components
Transversal competencies	CT1 Honorable, responsible, ethical behavior, in the spirit of the law, to ensure the professional reputation CT3 Demonstrating initiative and pro-active behavior for updating professional, economical and organizational culture knowledge

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

7.1 General objective of the discipline	• To get acquainted with the fundamental concepts concerning concurrency control, database recovery, database security, query optimization, distributed databases
7.2 Specific objective of the discipline	• To create ADO.NET applications with data-bound controls • To handle concurrently running transactions using pessimistic and optimistic isolation levels • To optimize SQL queries

8. Content

8.1 Course	Teaching methods	Remarks
1-3. Introduction. Transactions, Concurrency Control	Interactive presentation Conversation Examples Explanation	
4-5. Database Recovery	Interactive presentation Conversation Examples Explanation	

6. Database Security	Interactive presentation Conversation Examples Explanation	
7-10. Evaluating Relational Operators. Query Optimization	Interactive presentation Conversation Examples Explanation	
11-12. Distributed Databases	Interactive presentation Conversation Examples Explanation	
13. Parallel Databases. Data Stream Processing	Interactive presentation Conversation Examples Explanation	
14. Problems	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 (2nd Edition), Pearson Education, 2009

KNUTH, D.E., Tratat de programare a calculatoarelor. Algoritmi fundamentali, Editura Tehnică, București, 1974

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LEVENE, M., LOIZOU, G., A Guided Tour of Relational Databases and Beyond, Springer, 1999

LITCHFIELD, D., ANLEY, C., HEASMAN, J., GRINDLAY, B., The Database Hacker's Handbook: Defending Database Servers, John Wiley & Sons, 2005

LIU, L., OZSU, M.T., Encyclopedia of Database Systems, Springer, 2009

RAMAKRISHNAN, R., GEHRKE, J., Database Management Systems (3rd Edition), McGraw-Hill, 2002

SILBERSCHATZ, A., KORTH, H., SUDARSHAN, S., Database System Concepts (6th Edition), McGraw-Hill, 2011

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

*** Azure Stream Analytics - technical documentation, https://azure.microsoft.com/en-us/services/stream-analytics/

8.2 Seminar	Teaching methods	Remarks
1-2. ADO.NET	Conversation Problems Examples Explanation	
3. Transactions. Concurrency Control	Conversation Problems Examples Explanation	
4. Multiversioning	Conversation Problems Examples Explanation	
5-6. Performance Tuning in SQL Server	Conversation Problems Examples Explanation	
7. Problems	Conversation Problems Examples Explanation	
Bibliography Course bibliography		

8.3 Laboratory	Teaching methods	Remarks
1-2. ADO.NET	Conversation Problems Examples Explanation	
3-7. Transactions. Concurrency Control	Conversation Problems Examples Explanation	
Bibliography 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

- 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.
- The course is part of the academic curriculum of all major universities in Romania and abroad.
- The course structure follows the IEEE and ACM Recommendations concerning the Computer Science curriculum.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	• to know and apply the concepts described at the course • to solve problems	• written exam	50%
10.5 Seminar/lab activities	• to be able to apply the concepts from the course and seminar to create applications that manage databases, to manage concurrent transactions	• lab evaluation	50%
		• practical exam	
10.6 Minimum performance standards			

- 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.
- To attend the exam, a student must have at least 5 seminar attendances and at least 6 laboratory attendances, according to the Computer Science Department's decision: https://www.cs.ubbcluj.ro/wp-content/uploads/Hotarare-CDI-29.04.2020.pdf

Date | Signature of course coordinator | Signature of seminar coordinator

17.05.2022

Date of approval | Signature of the head of department

Prof. dr. Laura Dioşan

24.05.2022