



COURSE DESCRIPTION

1. Program Information

1.1 University	“Alexandru Ioan Cuza” University of Iași
1.2 Faculty	Faculty of Computer Science
1.3 Department	Department of Computer Science
1.4 Study Domain	Computer Science
1.5 Study Cycle	Undergraduate Studies
1.6 Study Program / Qualification	Computer Science/Computer Science Graduate

2. Course Information

2.1 Course Name	Databases						
2.2 Course Teacher	Assoc. Prof. Mihaela BREABĂN Lect. dr. Cosmin VÂRLAN						
2.3 Seminary Teacher	Assoc. Prof. Mihaela BREABĂN Lect. dr. Cosmin VÂRLAN						
2.4 Study Year	2	2.5 Semester	1	2.6 Evaluation	EF	2.7 Course Status*	OB

* OB – Compulsory / OP – Optional

3. Total estimated hours (hours per semester and didactic activities)

3.1 Hours per week	4	in which: 3.2 course	2	3.3 seminary/laboratory	2
3.4 Hours in curriculum	56	in which: 3.5 course	28	3.6 seminary/laboratory	28
Time Distribution					hours
Manual study, Course support, Bibliography, and others					20
Supplementary Documentation in library, in electronic forums, and on the field					20
Seminaries/laboratories preparation, homeworks, reports, portfolios and essays					40
Tutoring					
Evaluation					4
Other activities (consultations per student)					
3.7 Total hours individual study					80
3.8 Total hours per semester					150
3.9 Credits					6

4. Preconditions (if necessary)

4.1 Of Curriculum	--
4.2 Of Skills	--

5. Conditions (if necessary)

5.1 For Course Operation	--
5.2 For Seminary/Laboratory Operation	The presence at the labs is mandatory



6. Specific Skills Acquired

Professional Skills	<p>The understanding of the basic models for data organization and management. The ability to use the methodologies and the frameworks for database design for solving specific problems. Managing and optimization of relational databases. Querying relational databases.</p>
Transversal Skills	<p>The students will be able to incorporate in any software application a component for efficient data management.</p>

7. Course Objectives (from the grid of specific skills acquired)

7.1 General Objectives	<p>Acquiring the necessary capabilities to design, manage, optimize and query relational databases.</p>
7.2 Specific Objectives	<p>O1. Exemplifying and comparing existing database models. O2. Designing an anomaly-free relational database schema. O3. Querying a relational database. O4. Administrating and optimizing a relational database.</p>

8. General Description

8.1	Course	Teaching Methods	Observations (hours and bibliographic references)
1.	Database models and systems: historical view, features, ACID vs. BASE, SQL vs NoSQL; The relational model. Codd's rules	Lecturing accompanied by slides, questioning, case studies	2
2.	Relational database design: the Entity/Relationship model	Lecturing accompanied by slides, questioning, exemplifying at the blackboard	2
3.	Relational algebra: tuples, relations, operators	Lecturing accompanied by slides, conducting proofs at the blackboard	2
4.	Relational algebra: functional dependencies; inferences; closures	Lecturing accompanied by slides, conducting proofs at the blackboard	2



5.	Relational algebra: multivalued dependencies; inferences; closures	Lecturing accompanied by slides, conducting proofs at the blackboard	2
6.	Normal forms	Lecturing accompanied by slides, conducting proofs at the blackboard	2
7.	Design by decomposition: normalization Denormalization	Lecturing accompanied by slides, conducting proofs at the blackboard	2
8.	Recap	Individual work	2
9.	Physical design. Constraints on data. Views	Lecturing accompanied by slides, running scripts	2
10.	Indexing (1)	Lecturing accompanied by slides, solving exercises at the blackboard	2
11.	Indexing (2)	Lecturing accompanied by slides, solving exercises at the blackboard	2
12.	Query processing (1)	Lecturing accompanied by slides	2
13.	Query processing (2)	Lecturing accompanied by slides, running queries and expecting execution plans	2
14.	Recap	Solving exercises	2

Bibliography

- Hector Garcia-Molina, Jeff Ullman, Jennifer Widom: Database Systems: The Complete Book, Prentice Hall; 2nd edition (June 15, 2008)
- Thomas Connolly, Carolyn Begg: Database Systems: A Practical Approach to Design, Implementation and Management, (5th edition) Addison Wesley, 2009

8.2	Seminary / Labs	Teaching methods	Observations (hours and bibliographic references)
1.	The relational model and SQL – overview. SQLPlus. Users, roles	Exercises, interactive methods	2
2.	The SELECT phrase: Operators, WHERE and ORDER BY clauses	Exercises, interactive methods	2
3.	Single-row functions in SQL	Exercises, interactive methods	2
4.	Natural/inner/outer join	Exercises, interactive methods	2
5.	Self-Join	Exercises, interactive methods	2
6.	Grouping and aggregating records	Exercises, interactive methods	2



7.	Operators in relational algebra Expressing queries in relational algebra	Exercises, interactive methods	2
8.	Evaluation	Individual work	2
9.	Uncorrelated subqueries	Exercises, interactive methods	2
10.	Correlated subqueries	Exercises, interactive methods	2
11.	Complex SQL queries	Exercises, interactive methods	2
12.	Substitution variables in SQLPlus DML statements DDL statements Transactions	Exercises, interactive methods	2
13.	Entity-Relationship design Design by decomposition	Exercises, interactive methods	2
14.	Database design: DDL- declaring constraints, views	Exercises, interactive methods	2

BibliographyLab web page: www.info.uaic.ro/~bd**9. Course content synchronization with the expectations of the community representatives, professional associations and employers from the program domain**

The content of the course is designed to address the necessities of the employers from the IT industry

10. Evaluation

Activity Type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 The weight of each evaluation form (%)
10.4 Course	<ul style="list-style-type: none">- proving the ability to solve queries in a short written test;- the understanding of the relational model, relational operators, functional and multivalued dependencies;- the ability to apply the relational design principles;- the understanding of indexing mechanisms	Written test	50%



	- the understanding of query processing - the understanding of updatable views -the understanding of transactions		
10.2 Seminary/ Laboratory	Solving queries	Evaluating the weekly lab activity (10%) Evaluating the activity recorded in the dedicated application (40%)	50%
10.6 Minimal performance standards			
<ul style="list-style-type: none">• A minimum of 10 active presences at the lab• Graduating each chapter in the dedicated application on time• Mastering the SQL language – proven by solving at least 50% of the SQL test• A minim of 20 points obtained in written test			

Date

Course Teacher

Seminary/Laboratory Teacher

Department Date of Approval

Director of the Department