

SYLLABUS OF THE COURSE¹

1. Data on Study Programme

1.1 University	Universitatea „Politehnica” din Timișoara
1.2 Faculty ² / Department ³	Automatică și Calculatoare / Calculatoare
1.3 Chair	-
1.4 Domains of study	Computers and Information Technology
1.5 Study level	Bachelor
1.6 Study Programme / Qualification	Computers / Engineer

2. Course Information

2.1 Course name	Databases						
2.2 Course instructor	Assoc.Prof.Dr.Eng. Dan Pescaru						
2.3 Lab instructor	Lect.Dr.Eng. Codruta Istin						
2.4 Year of study	2	2.5 Semester	4	2.6 Evaluation	D	2.7 Type of course	Mandatory

3. Total Estimated Time (hours per semester of didactical activity)

3.1 Number of hours/week	4	in which:3.2 course	2	3.3 seminary/laboratory	2
3.4 Total hours in curricula	56	in which:3.5 course	28	3.6 seminary/laboratory	28
Time distribution					Hours
Study on book, course notes, bibliography and student notes					16
Library documentation, electronic platform usage and study on the field					18
Seminary/Lab preparation, homework, reports, portfolio and essay					8
Tutoring					7
Examination					3
Other activities					
				3.7 Total individual study hours	52
				3.8 Total hours/semester	108
				3.9 Credits	5

4. Precondition (if is the case)

4.1 curriculum	<ul style="list-style-type: none"> No
4.2 competences	<ul style="list-style-type: none"> Basic computer usage

5. Activity Conditions (if is the case)

5.1 course	<ul style="list-style-type: none"> 60 places room, laptop, projector, blackboard.
5.2 seminary/lab	<ul style="list-style-type: none"> Lab room with 15-18 PC, blackboard, development environments for Prolog, Java, C++

6. Specific Competencies

1 Formularul corespunde Fișei Disciplinei promovată prin OMECTS 5703/18.12.2011 (Anexa3);
 2 Se înscrie numele facultății care gestionează programul de studiu căruia îi aparține disciplina;
 3 Se înscrie numele departamentului căruia i-a fost încredințată susținerea disciplinei și de care aparține titularul cursului;

Professional Competences ⁴	<ul style="list-style-type: none"> • Operating with fundamentals of sciences, engineering, and computer science • Designing hardware, software and communication components • Problem solving using the instruments of computer science and engineering
Transversal Competences	<ul style="list-style-type: none"> • Demonstrating initiative and engaging in updating one's professional, economic and organizational knowledge

7. Course Objectives

7.1 General objectives	<ul style="list-style-type: none"> • Acquiring concepts and practice for the development of industrial databases
7.2 Specific objectives	<ul style="list-style-type: none"> • Understand relational databases principles and specific issues • Learn design methods using relational algebra theory and database normalization • Learn SQL language and queries implementation • Understand basic database management techniques • Developing skills implementing database clients and interfaces

8. Contents

8.1 Course	Hours	Teaching Methodology
1. Introduction 1.1 Data storing methods 1.2 Database and DBMS 1.3 DBMS Facilities 1.4 Database models: hierarchical, network, relational, OO	2	PowerPoint slides, discussions on the presentations, examples
2. ER model. XBase model 2.1 The ER model 2.2 Designing ER diagrams 2.3 xBase model for small/medium size databases 2.4 xBase navigational language	2	
3. Indexing techniques 3.1 Data access optimization 3.2 Data sorting 3.3 Data hashing and indexing 3.4 Using indexes	2	
4. DB Graphical Interfaces 4.1 OO facilities for interface implementation 4.2 Event based programming 4.3 Forms 4.4 Reports	4	
5. Hierarchical and Network Data Structures 5.1 Implementing hierarchical structures 5.2 Using logical/physical links 5.3 Types of links 5.4 Implementing complex network structures	2	
6. Relational Algebra 6.1 Relational model 6.2 Integrity constraints 6.3 Relational query languages 6.4 Relational Algebra 6.5 DB Normalization	4	
7. SQL 7.1 SQL DDL 7.2 SQL active queries 7.3 SQL passive queries 7.4 Nested queries 7.5 Data summarization	8	
8. DB Clients implementation 8.1 Specific API implementation. C/C++ example 8.2 Generic API: ODBC, JDBC 8.3 Web databases using PHP+MySQL 8.4 Using stored procedures	4	

⁴ Aspectul competențelor profesionale va fi tratat cf. Metodologiei OMECTS 5703/18.12.2011. Se vor prelua competențele care sunt precizate în Registrul Național al Calificărilor din Învățământul Superior RNCIS (http://www.rncis.ro/portal/page?_pageid=117,70218&_dad=portal&_schema=PORTAL) pentru domeniul de studiu de la pct. 1.4, programul de studii de la pct. 1.6 din această fișă și materia în cauză

Bibliography		
<ol style="list-style-type: none"> 1. Databases – course notes, 2013. 2. R- Ramakrishnan, J. Gehrke, "Database Management Systems", 3rd ed., ISBN 007-2465-63-8, McGraw-Hill, 2003. 3. Oracle, "Oracle Database 11g Documentation", http://docs.oracle.com/, 2012. 		
8.2 Seminary/laboratory	Hours	Teaching Methodology
1. Creating and using data files. Expressions, operators, variables and functions. Using dBase Plus development environment.	2	Topic presentation, discussions, problems solving.
2. Using xBase language	2	
3. Using UI components: screens, windows, forms and objects	2	
4. Designing graphical interfaces. Use Designer generator to create windows graphical objects, menus, forms and reports	2	
5. Sorting and indexing files.	2	
6. Design complex applications. Implementing hierarchical structures	2	
7. Implementation of network structures	2	
8. SQL. Creating database objects in MySQL/Oracle 11g	2	
9. Implementing SQL active and passive queries	2	
10. Implementing SQL grouping	2	
11. Complex SQL nested queries	2	
12. Implementing JDBC clients	2	
13. Web database using PHP+MySQL	2	
14. Lab review	2	
Bibliography		
<ol style="list-style-type: none"> 1. R- Ramakrishnan, J. Gehrke, "Database Management Systems", 3rd ed., ISBN 007-2465-63-8, McGraw-Hill, 2003. 2. Mahar, P., Escobar, E., "Visual dBASE 5.5 Unleashed", SAMS Publishing, ISBN 978-067230-877-2, 1996. 3. Oracle, "Oracle Database 11g Documentation", http://docs.oracle.com/, 2012. 		

9. Correlation of the subject to the requirements of professionals in the field and with representative employers' expectations

<ul style="list-style-type: none"> • Databases are fundamentals in all modern successful businesses. Indeed, due the large amount of information processed (financial, management, technical data) all companies rely on database systems. • Large amount of database developer/administrator positions are open every year on all job fair and companies' employment offers.

10. Evaluation Procedure

Activity Type	10.1 Evaluation Criteria	10.2 Evaluation Methods	10.3 Weight in the Final Mark
10.4 Course	Assessment of theoretical knowledge	Written evaluation	15 %
	Problem solving ability	Written evaluation	35 %
10.5 Seminary/laboratory	Lab problems solutions	Presentation solving, questions, answers	45 %
	Presence	Records of attendance	5 %
10.6 Minimum performance standard (the amount of knowledge necessary to promote discipline and checking procedure)			
<ul style="list-style-type: none"> • Demonstrate theoretical knowledge level through replies to 5-6 questions (min. 50%) • Implementing xBase and SQL solutions to query a database. (min. 50%) • Demonstrate ability to implement a database and a database client. (working solutions to min. 80% of the lab problems) 			

11. International Compatibility

<ul style="list-style-type: none"> • Stanford University, USA, CS145: Introduction to Databases, http://infolab.stanford.edu/~widom/cs145/index.html • York University, Canada, CSE-3421M, Introduction to Database Systems, http://www.cse.yorku.ca/course_archive/2012-13/W/3421/ • Cornell University, USA, CS 4320 - Introduction to Database Systems, http://courses.cornell.edu/preview_course_nopop.php?catoid=14&coid=160298
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Date

Course instructor
Assoc.Prof.Dr.Eng. Dan PESCARU

Seminary/Laboratory Instructor
Lect.Dr.Eng. Codruta ISTIN

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Department approval date

Head of Department
Prof.Dr.Eng. Vladimir Ioan CREȚU

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