SYLLABUS

1. Data about the program of study

1.1	Institution	Technical University of Cluj-Napoca
1.2	Faculty	Automation and Computer Science
1.3	Department	Automation
1.4	Field of study	System Engineering
1.5	Cycle of study	Bachelor
1.6	Program of study/Qualification	Applied Automation and Informatics
1.7	Form of education	Full time
1.8	Subject code	27.00

2. Data about the subject

2.1	Subject name				Databases		
2.2	Subject area				Databases		
2.2	Course responsible/lecturer				Assoc. Prof. Eng. PhD Delia-Alexandrina Mitrea – Delia.Mitrea@cs.utcluj.ro		
2.3	Teachers in charge of seminars				Assoc. Prof. Eng. PhD Delia-Alexandrina Mitrea – Delia.Mitrea@cs.utcluj.ro Senior Lect. Eng., PhD, Calin Ovidiu Cenan – Calin.Cenan@cs.utcluj.ro Eng., PhD, Cristi Mocan – Cristi.Mocan@cs.utcluj.ro		
2.4 Year of study	2	2.5 Semester	2	2.6 Assessment	Written Examination	E	
2.7 Subject category	Formative category					FD (Fundamental Discipline)	
	Optionality					DOB (Compulsory)	

3. Estimated total time

3.1 Number of hours per week	4	of which	3.2 Course	2	3.3 Seminar		3.3 Laboratory	2	3.3 Project	
3.4 Total hours in the curriculum	56	of which	3.5 Course	28	3.6 Seminar		3.6 Laboratory	28	3.6 Project	
3.7 Individual study:										
(a) Manual, lecture material and notes, bibliography										46
(b) Supplementary study in the library, online and in the field										12
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										6
(d) Tutoring										3
(e) Exams and tests										2
(f) Other activities										0
3.8 Total hours of individual study (summ (3.7(a)...3.7(f)))										69
3.9 Total hours per semester (3.4+3.8)										125
3.10 Number of credit points										5

4. Pre-requisites (where appropriate)

4.1	Curriculum	Linear Algebra, Special Mathematics, Computer Programming
4.2	Competence	Basics of Computer Use, Computer Programming

5. Requirements (where appropriate)

5.1	For the course	N/A
5.2	For the applications (Laboratories)	Attendance compulsory

6. Specific competences

Professional competences	**C2** - Operating with fundamental concepts of computer science, information technology and communications **C2.1** Description of the operation and structure of computing systems, communication networks and their applications in systems engineering using knowledge related to programming languages, environments and technologies, programming engineering and specific tools (algorithms, schemes, models, protocols, etc.). **C2.2** Reasoned use of concepts from informatics and computer technology in solving well-defined problems in systems engineering and in applications that require the use of hardware and software in industrial systems or in computer systems.
Cross competences	N/A

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Design, implementation, and use of Databases
7.2	Specific objectives	The appropriate understanding of the data models Design, implementation, and query of databases in an efficient manner Working with databases in the context of a Database Management System (DBMS) Design and implementation of software applications for accessing and processing data from the database

8. Contents

8.1. Lecture (syllabus)	Number of hours	Teaching methods	Notes
Introduction – History of Databases and Fundamental Notions	2	Slides,	
Database architecture	2		
Database Management Systems – classic DBMSs; OO DBMS; Knowledge-Based Systems	2		

Data modeling. Classic data models: the hierarchical model and the network model	2	discussions with students, examples and exercises on the blackboard/ whiteboard	
The relational data model	2		
The entity-relationship (E/R) model	2		
Comparative analysis of data models	2		
Relational Algebra. Relational Data Manipulation Languages (DML)	2		
The SQL language	2		
Relation Normalization	2		
The physical level of the database	2		
Web applications that interact with databases	2		
MySQL databases			
Oracle Databases (Oracle Academy)			

Bibliography

R. Dollinger, Baze de Date si Gestiunea Tranzactiilor, Ed. Albastra 1998
R. Ramakrishnan, J. Gerhrke, Database Management Systems, McGraw Hill, 2002
P. Mitrea, Accesibilitate WEB, Multimedia, Paralelism si Arhitecturi Distribuite pentru Baze de Date de Inalta Performanta, Ed. U.T. Press, 2008
Th. Borangiu &al, DB2 UDB: Fundamente si Administrare, Editura AGIR, 2006
Joe Celko, Joe Celko's data and databases concepts in practice , Morgan Kaufman, 1999

8.2. Seminars /Laboratory/Project	Number of hours	Teaching methods	Notes
Introduction to SQL. SELECT phrase. Queries; interactive website http://www.sqlzoo.net	2	Slides, practical exercises on the blackboard and on computers, individual study from the dedicated bibliography, homework	
Advanced SQL queries; interactive website http://www.sqlzoo.net	2		
Creating the database in Microsoft SQL Server 2008/ Management Studio or Oracle Academy, using the SQL language and the functionalities of the environment. SQL statements for inserting, updating and deleting data. Definition of Constraints and Integrity Rules.	2		
SQL queries in Microsoft SQL Server or Oracle	2		
Views. Defining Views, updating, deleting in SQL Server or Oracle Academy. Batch files.	2		
Stored procedures, triggers, cursors in SQL Server or Oracle Academy.	2		
Creating a simple web page using HTML and PHP.	2		
Creating a dynamic web page, using HTML, PHP and MySQL. Passing parameters between HTML and PHP. Connecting to the Database and interacting with the DB through insertion, update and deletion operations.	2		
Creating a simple website.	2		
Improving the appearance of the website, using Cascaded Style Sheets (CSS).	2		
Exercises	2		
Individual activity – generating a dynamic website	2		
Individual activity – generating a dynamic website	2		

Final test	2		

Bibliography

[1] R. Dollinger, Utilizarea sistemului **SQL Server**, Ed. Albastra, 2001
[2] Th. Borangiu & al., DB2 UDB- Exercitii, Editura AGIR, 2006
[3] Joe Celko, Joe Celko's data and databases concepts in practice , Morgan Kaufman, 1999

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Most of the software applications developed in companies store data in databases, then communicate with the database and with the DBMS by defining the data as well as by means of their manipulation languages, incorporated in dedicated programming environments.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Understanding and assimilation of the knowledge taught in the course	Written Examination	70%
10.5 Seminars /Laboratory/Project	Practical abilities	Test of the skills acquired in the laboratory, at the end of the semester	30%
10.6 Minimum standard of performance			
Minimum performance standard: Knowledge of Data Models and SQL Query Language; both the grade from the laboratory and the grade from the written exam must be at least 5.			

Date of filling in:		**Title Surname Name**	**Signature**
27.04.2023	Lecturer	Assoc. Prof., Eng., PhD, Delia-Alexandrina Mitrea	
	Teachers in charge of application	Assoc. Prof., Eng., PhD, Delia-Alexandrina Mitrea	
		Senior Lect. Eng., PhD, Calin Ovidiu Cenan	
		Eng. PhD Cristi Mocan	

Date of approval in the department…. _____	Head of department Prof.dr.ing. Honoriu Vălean
Date of approval in the faculty… _____	Dean Prof.dr.ing. Liviu Miclea