

COURSE DESCRIPTION

1. Program identification information

1.1 Higher education institution	University POLITEHNICA of Bucharest
1.2 Faculty	Faculty of Electronics, Telecommunications and Information Technology
1.3 Department	Applied Electronics and Information Engineering
1.4 Domain of studies	Electronics Engineering and Telecommunications
1.5 Cycle of studies	Licence
1.6 Program of studies/Qualification	Technology and Telecommunications Systems

2. Course identification information

2.1 Name of the course				Databases			
2.2 Lecturer				Lect. PhD. Eng. Valentin Pupezescu			
2.3 Instructor for practical activities				Lect. PhD. Eng. Valentin Pupezescu			
2.4 Year of studies	IV	2.5 Semester	7	2.6 Evaluation type	Verificati on	2.7 Course choice type	Optional

3. Total estimated time (hours per semester for academic activities)

3.1 Number of hours per week, out of which	3	3.2 course	2	3.3 practical activities	1
3.4 Total hours in the curricula, out of which	42	3.5 course	28	3.6 practical activities	14
Distribution of time					hours
Study according to the manual, course support, bibliography and hand notes					20
Supplemental documentation (library, electronic access resources, in the field, etc)					8
Preparation for practical activities, homeworks, essays, portfolios, etc.					3
Tutoring					1
Examinations					4
Other activities					0
3.7 Total hours of individual study					36
3.9 Total hours per semester					78
3.10 Number of ECTS credit points					3

4. Prerequisites (if applicable)

4.1 curricular	Attending the following subjects: - Computer programming (PC) - Data structures and algorithms (SDA) - Object-Oriented programming (POO)
4.2 competence-based	Basic knowledge of the Linux operating system.

5. Requisites (if applicable)

5.1 for running the course	There isn't one.
5.2 for running of the applications	Laboratory attendance.

6. Specific competences

Professional competences	Applying the knowledge, concepts and basic methods regarding computer system architectures, micro-controllers, programming languages and programming techniques. The design and use of reduced complexity hardware and software applications specific to the applied electronic field.
Transversal competences	Methodical analysis of the problems encountered in work, identifying the items for which solutions are established, ensuring professional tasks. Adapting to new technologies, professional and personal development through training using printed documentation sources, specialized software, and electronic resources translated in romanian language and at least one foreign language.

7. Course objectives (as implied by the grid of specific competences)

7.1 General objective of the course	The course presents the major architectural aspects of database systems, database programming languages, libraries and interfaces used for the implementation and use of databases and applications for them.
4.2 Specific objectives	Laboratory applications aim to help students to know how to work with different database management systems (MySQL, MariaDB, SQL Server, Oracle). The students are involved in database implementations and applications using programming languages, libraries and specific interfaces (SQL, Transact-SQL, PL / SQL, ODBC, JDBC)

8. Content

8.1 Lectures	Teaching techniques	Remarks
1. Basic concepts in database systems: 1.1. Architecture of database systems 1.2. Classification of database systems 1.3. Data modeling – Entity-Relationship diagram	Teaching is based on using the projector (covering communication function and demonstration). Courses are available online.	2 hours
2. Relational databases: 2.1. Relations, domains and attributes 2.2. Integrity constraints (primary and foreign keys) 2.3. Indexes 2.4. Cursors, stored procedures and triggers	Teaching is based on using the projector (covering communication function and demonstration). Courses are available online.	8 hours
3. SQL language: 3.1. Lexical structure of SQL language 3.2. Data types and domains in SQL 3.3. Data definition instructions 3.4. Data manipulation instructions	Teaching is based on using the projector (covering communication function and demonstration). Courses are available online.	2 hours
4. Queries in relational databases: 4.1. Relational algebra and relational calculus 4.2. Queries in one and more relations 4.3. Expressing queries in SQL language	Teaching is based on using the projector (covering communication function and demonstration). Courses are available online.	4 hours
5. Relational database design and implementation: 5.1. Development stages of databases 5.2. Database design 5.3. implementation and utilization of databases	Teaching is based on using the projector (covering communication function and demonstration). Courses are available online.	2 hours
6. Languages and interfaces for database applications programming: 6.1. Procedural SQL extension	Teaching is based on using the projector (covering communication function and demonstration).	6 hours

languages (Transact-SQL) 6.2. SQL embedded languages (ESQL/C, SQLJ) 6.3. Interfaces for database applications programming (ODBC, JDBC)	Courses are available online.	
7. Database normalization: 7.1. Functional dependencies and normal forms 7.2. Multi-valued and join dependencies 7.3. Imposing dependencies that are not determined by keys using stored procedures and triggers	Teaching is based on using the projector (covering communication function and demonstration). Courses are available online.	2 hours
8. Transaction management and database recovery: 8.1. Transaction properties and scheduling 8.2. Concurrency control of transactions 8.3. Database recovery	Teaching is based on using the projector (covering communication function and demonstration). Courses are available online.	2 hours
Bibliography - Felicia Ionescu: Baze de Date Relationale si Aplicatii, Editura Tehnica, 2004 - MySQL Database Management System, http://www.mysql.com - C.J.Date: An Introduction to Database Systems, Addison-Wesley, 1995 - R. Dolliner: Baze de Date si Gestiunea Tranzactiilor, Editura Albastra, 1997 - Oracle Database Management System, http://www.oracle.com - SQL Server Database Management System, http://www.microsoft.com/sql - Felicia Ionescu: Indrumar de laborator de Proiectare Baze de Date		
8.2 Practical applications	Teaching techniques	Remarks
1. Presentation of practical database management systems	For the laboratory documentation there is a website that contains a description of the work and exercises for every lab. Every lab is done individual by students on the computer (using the selected language and toolsets for the job). Each laboratory work involves the presentation of theoretical and practical concepts that must be assimilated by students. Some labs may need the video projector in order to	2 hours
2. Database querying using SQL language		2 hours
3. Relational database design and implementation		2 hours
4. Database normalization		2 hours
5. Transactions management		2 hours
6. Developing database applications using Java Server Pages technology		2 hours
7. Laboratory evaluation		2 hours

	demonstrate the most important practical aspects of the lab.	
Bibliography - Felicia Ionescu: Baze de Date Relationale si Aplicatii, Editura Tehnica, 2004 - MySQL Database Management System, http://www.mysql.com - C.J.Date: An Introduction to Database Systems, Addison-Wesley, 1995 - R. Dolliner: Baze de Date si Gestiunea Tranzactiilor, Editura Albastra, 1997 - Oracle Database Management System, http://www.oracle.com - SQL Server Database Management System, http://www.microsoft.com/sql - Felicia Ionescu: Indrumar de laborator de Proiectare Baze de Date		

9. Bridging the course content with the expectations of the epistemic community representatives, professional associations and employers representatives for the domain of the program

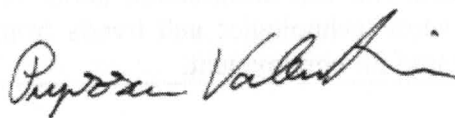
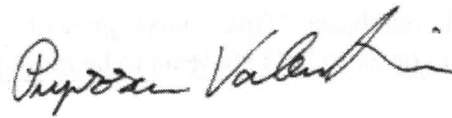
Databases management systems are very important due to their ability to store and manage a lot of data. Moreover, they allow importing and exporting data to applications. It also provides data security and concurrent access to it. The "Databases" discipline provides vital information about the design, implementation and management of databases to students. The course does not offer only information related to relational databases, but also information about newer DBMS - NoSQL databases. This course presents the latest technologies and trends from the database world in order to help students to be more prepared for employment.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final mark
10.4 Lectures	- knowledge of fundamental databases theoretical concepts; - knowing how to apply theory to solve and optimize the databases; - Knowledge of TransactSQL syntax for solving the required queries.	Two written tests for verification of equal weights (30%) during the semester. Topics pursue both the assimilation of theoretical concepts and their practical implementations in TransactSQL.	60%
10.5 Practical applications	- Proper database design; - The database implementation - this is made from the linux console;	Laboratory exam. This is done individually by the students on computers. They must design, implement,	40%

	<ul style="list-style-type: none"> - Perform basic query operations on relations such as select, insert, update or delete; - Creatingt an interface to the database using the Java Server Pages technology. - Implementation of triggers and stored procedures. 	interogate, modify the database from the linux terminal and from a web application.	
10.6 Minimal performance standard			
Support and promotion of a test on the architecture and functional principles of a structure hardware and / or software			

Date	Lecturer	Instructor for practical activities
25.09.2017	SI.Dr.Ing.Valentin PUPEZESCU	SI.Dr.Ing.Valentin PUPEZESCU

Date of department approval

26.09.2017

Director of Department,

Assoc. Prof. PhD. Eng. Sever PAȘCA

