Universitatea Națională de Știință și Tehnologie Politehnica București
Facultatea de Electronică, Telecomunicații și
Tehnologia Informației

COURSE DESCRIPTION

1. Program identification information

1.1 Higher education institution	**National University of Science and Technology Politehnica Bucharest**
1.2 Faculty	**Electronics, Telecommunications and Information Technology**
1.3 Department	**Telecommunications**
1.4 Domain of studies	Electronic Engineering, Telecommunications and Information Technology
1.5 Cycle of studies	Bachelor/Undergraduate
1.6 Programme of studies	Technologies and Telecommunications Systems

2. Date despre disciplină

2.1 Course name (ro) (en)				Baze de date			
2.2 Course Lecturer				Conf. Dr. Bogdan-Cosmin MOCANU			
2.3 Instructor for practical activities				Conf. Dr. Bogdan-Cosmin MOCANU			
2.4 Year of studies	2	2.5 Semester	II	2.6. Evaluation type	V	2.7 Course regime	Ob
2.8 Course type		D	2.9 Course code	04.D.04.O.020		2.10 Tipul de notare	Nota

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

3.1 Number of hours per week	3	Out of which: 3.2 course	2.00	3.3 seminary/laboratory	1
3.4 Total hours in the curricula	42.00	Out of which: 3.5 course	28	3.6 seminary/laboratory	14
Distribution of time:					hours
Study according to the manual, course support, bibliography and hand notes Supplemental documentation (library, electronic access resources, in the field, etc) Preparation for practical activities, homework, essays, portfolios, etc.					29
Tutoring					0
Examinations					4
Other activities (if any):					0

3.7 Total hours of individual study	33.00
3.8 Total hours per semester	75
3.9 Number of ECTS credit points	3

4. Prerequisites (if applicable) (where applicable)

4.1 Curriculum	Completing and/or promoting the following disciplines: •Computers Programming •Algorithms and Data Structures •Object Oriented Programming
4.2 Results of learning	•Elementary handling and skills in using Windows as operating system •Computer programming skills

5. Necessary conditions for the optimal development of teaching activities (where applicable)

5.1 Course	The course will take place in a room equipped with a video projector and a computer
5.2 Seminary/ Laboratory/Project	Mandatory attendance at laboratories (according to the UPB regulation for bachelor studies); The laboratory will take place in a room with specific equipment, which must include computers with the WampServer software installed.

6. General objective *(Reffering to the teachers' intentions for students and to what the students will be thought during the course. It offers an idea on the position of course in the scientific domain, as well as the role it has for the study programme. The course topics, the justification of including the course in the currcula of the study programme, etc. will be described in a general manner)*

The discipline aims to familiarize students with concepts regarding the database management systems and learn them how to design, administrate, optimize and interrogate relational databases.

7. Competences *(Proven capacity to use knowledge, aptitudes and personal, social and/or methodological abilities in work or study situations and for personal and proffesional growth. They refflect the empolyers requirements.)*

Specific Competences	•Demonstrate basic knowledge about database management systems; •Correlates and apply the knowledge gained to understand and solve specific problems related to database management systems They will be able to correlate and apply the knowledge to design, administrate, optimize and interrogate relational databases. •It applies standardized methods and tools, specific to the databases field. •It argues and analyzes coherently and correctly the context of application of the databases. •Oral and written communication in English: students demonstrate understanding of the vocabulary related to the field of Communication Networks.
Transversal (General) Competences	•Works in a team and communicates effectively, coordinating efforts with others to solve problem situations of medium complexity. •Autonomy and critical thinking: the ability to think in scientific terms, search and analyze data independently, and draw and present conclusions / identify solutions. •Ability to analyze and synthesize: presents the acquired knowledge in a synthetic way, as a result of a process of systematic analysis. •Adaptation to new technologies and professional development, through continuous training using printed documentation sources, specialized software and electronic resources. •Respect the principles of academic ethics: correctly cite the bibliographic sources used in the documentation activity.

8. Learning outcomes *(Synthetic descriptions for what a student will be capable of doing or showing at the completion of a course. The learning outcomes reflect the student's acomplishments and to a lesser extent the teachers' intentions. The learning outcomes inform the students of what is expected from them with respect to performance and to obtain the desired grades and ECTS points. They are defined in concise terms, using verbs similar to the examples below and indicate what will be required for evaluation. The learning outcomes will be formulated so that the correlation with the competences defined in section 7 is highlighted.)*

Knowledge	*The result of knowledge aquisition through learning. The knowledge represents the totality of facts, priciples, theories and practices for a given work or study field. They can be theoretical and/or factual.* •Defines domain-specific notions: databases, relational model, database management systems •Describes the relations and interactions between the key components of a database. •Describes the main components of a relational database. •Describes the basic rules to define a database.
Skills	*The capacity to apply the knowledge and use the know-how for completing tasks and solving problems. The skills are described as being cognitive (requiring the use of logical, intuitive and creative thinking) or practical (implying manual dexterity and the use of methods, materials, tools and intrumentation).* •Define and modify the database structure / learn how to: insert records into a table, define complex queries, create views, create and use database-related reports, export and import data. •Implement databases specific to the area of interest, solve specific problems and create web pages that interact with the database. •Implements and experimentally verifies different solutions. •Works productively in a team.
Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* Select appropriate bibliographic sources and analyze them. Demonstrates responsiveness to new learning contexts. Demonstrates collaboration with other colleagues and teaching staff in carrying out teaching activities. Demonstrates autonomy in organizing the learning situation/context or the problem situation to be solved. Realizes the value of his contribution in the field of engineering to the identification of viable/sustainable solutions to solve problems in social and economic life. Demonstrates real-life situation management skills (time management, collaboration vs. conflict in solving a practical problem).

9. Teaching techniques *(Student centric techniques will be considered. The means for students to participate in defining their own study path, the identification of eventual fallbacks and the remedial measures that will be adopted in those cases will be described.)*

Starting from the analysis of the learning characteristics of students and from their specific needs, the teaching process will explore both expository (lecture, exposition) and conversational-interactive teaching methods, based on various types of learning models: learning through discovery - facilitated by the direct and indirect exploration of reality (experiment, demonstration, modelling) and action-based learning - such as exercise, practical activities and problem solving. Within the teaching activity the lectures will be based on Power Point presentations or different videos that will be made available to students. Each course will start with the recapitulation of the chapters already completed, with a focus on the notions presented in the last course. The presentations use various images and schematics so that the information presented is easy to

understand and to assimilate. This discipline covers information and practical activities are designed to support the students during the learning efforts in order to develop optimal relationships of collaboration and communication in a climate conducive to learning through discovery.

10. Contents

COURSE		
Chapter	**Content**	**No. hours**
1	General concepts regarding database management systems. Functions performed by database management systems. Types of users. Architecture of database management systems. Classification of database management systems.	2
2	Data modeling. Entity-Association Model. Hierarchical Model, Network Model. Rules for building conceptual models.	4
3	Relational databases: relationships, domains, attributes and integrity constraints. Conversion rules from the Entity / Association model to the Relational model.	4
4	Databases design by normalization.	2
5	Relational algebra vs. relational databases. Operations of: Union, Intersection, Difference, Selection, Projection. Queries in relational algebra.	2
6	SQL language. Data description language: Define and modify database schema, create and delete tables, MySQL data types, MySQL integrity constraints.	2
7	Data manipulation language (DML): methods for inserting, updating, and deleting records from the database.	2
8	Queries to extract data from tables. Arithmetic, comparison and logical operators. MySQL features.	3
9	Subqueries. SQL joints between tables. Union in MySQL.	3
10	Views. Triggers. Procedures. Cursors.	2
11	MySQL databases management through phpmyadmin. Creating web pages with access to databases.	2
	Total:	28
Bibliography:		

LABORATORY		
Crt. no.	**Content**	**No. hours**
1	Relational database management systems – MySQL.	2
2	Data description language: creating a database; data types definition in MySQL	2
3	Integrity constraints. Alter statement	2
4	Data manipulation language: insert, update, delete and simple queries.	2
5	SQL functions. Joins between tables	2
6	Users and privileges. Views. phpMyAdmin. Creating a web page with access to MySQL databases.	2
7	Discussing the homework and the final laboratory colloquium.	2
	Total:	14

Bibliography:

11. Evaluation

Activity type	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.4 Course	Knowledge of fundamental theoretical concepts; Knowledge of how to apply the theory to specific problems	Final evaluation test as multiple choice questionnaires, with the possibility of improving the final mark through oral verification.	30%
	Knowledge of fundamental theoretical concepts; Knowledge of how to apply the theory to specific problems	Homework which aims to increase students' analysis and synthesis capacity over a specific subject	30%
11.5 Seminary/laboratory/project	Knowledge of how to design a a database	Final laboratory colloquium - The theoretical part is verified based on a multiple choice test	10%
	Knowledge on how to create a database, insert records into a table, define complex queries, create views, create and use database-related reports, export and import data in MySql.		30%
11.6 Passing conditions			
•Getting 50% of the total score. •Attending at least four laboratory works			

12. Corroborate the content of the course with the expectations of representatives of employers and representative professional associations in the field of the program, as well as with the current state of knowledge in the scientific field approached and practices in higher education institutions in the European Higher Education Area (EHEA)

The database management systems are very important due to their ability to efficiently store and manage large amounts of data. Moreover, they allow importing and exporting data into applications. It also provides data security and concurrent access to data.
The "Databases" discipline provides vital information for students on how to design, implement and manage their own databases. The course offers information related not only to relational databases, but also information about new approaches in database domains (e.g. NoSQL databases). There are presented also the latest technologies so that students will be better prepared for their future jobs.
The discipline fits perfectly into the politics of the University “Politehnica” of Bucharest, both in terms of content and structure, and in terms of the aptitudes and international openness offered to students.

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Date	Course lecturer	Instructor(s) for practical activities
02.12.2024	Conf. Dr. Bogdan-Cosmin MOCANU	Conf. Dr. Bogdan-Cosmin MOCANU

Date of department approval	Head of department

Date of approval in the Faculty Council	Dean