

SYLLABUS

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Electronics, Telecommunications and Information Technology
1.3 Department	Communications
1.4 Field of study	Electronic Engineering, Telecommunications and Information Technologies
1.5 Cycle of study	Master of Science
1.6 Program of study / Qualification	Telecommunications / Master
1.7 Form of education	Full time
1.8 Subject code	TC-E16.50

2. Data about the subject

2.1 Subject name	Relational Databases						
2.2 Subject area	Theoretical area Methodological area Analytic area						
2.3 Course responsible	Professor Petre G. POP, Ph.D., Petre.Pop@com.utcluj.ro						
2.4 Teacher in charge with seminar / laboratory / project	Professor Petre G. POP, Ph.D., Petre.Pop@com.utcluj.ro						
2.5 Year of study	2	2.6 Semester	3	2.7 Assessment	E	2.8 Subject category	DS/DO

3. Estimated total time

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 laboratory	1
3.4 To Total hours in the curriculum	42	of which: 3.5 course	28	3.6 laboratory	14
Distribution of time					hours
Manual, lecture material and notes, bibliography					20
Supplementary study in the library, online specialized platforms and in the field					12
Preparation for seminars / laboratories, homework, reports, portfolios and essays					20
Tutoring					3
Exams and tests					3
Other activities:					
3.7 Total hours of individual study	58				
3.8 Total hours per semester	100				
3.9 Number of credit points	4				

4. Pre-requisites (where appropriate)

4.1 curriculum	Web Technologies and Databases
4.2 competence	Fundamental concepts of relational databases and standard SQL language. Ability to use an integrated development environment (IDE).

5. Requirements (where appropriate)

5.1. for the course	Video-projector, screen, whiteboard
5.2. for the seminars / laboratories / projects	PCs with Internet access

6. Specific competences

Professional competences	<p>C3. Application of the basic knowledge, concepts and methods regarding the architecture of computer systems, microprocessors, microcontrollers, languages and programming techniques.</p> <p>C4. Design, implementation and operation of data, voice, video and multimedia services. This is based on the understanding and the application of fundamental concepts in telecommunications and transmission of information.</p> <p>C5. Selecting, installing, configuring and operating fixed or mobile telecommunications equipment. Equipping a site with usual telecommunications networks.</p>
Cross competences	N.A.

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

7.1 General objective	Development of professional skills in the field of analysis, modeling and design of databases, database management, design and implementation of database SQL applications.
7.2 Specific objectives	<ol style="list-style-type: none"> 1. Assimilation of theoretical and practical knowledge of basic and advanced design and database administration. 2. Use of SQL language to create database applications.

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
1. Review of the relational model. A brief overview of the standard SQL language. Basic instructions. Defined functions.	<p>Presentation, heuristic conversation, exemplification, problem presentation, teaching exercise, case study, formative evaluation</p>	<p>Use of .ppt presentation, projector, blackboard</p>
2. Steps to develop a database. Data models, entity-association model. Conceptual design.		
3. Logical design. Normal forms. Physical design.		
4. Joins. Nested queries. Sub-queries.		
5. The MS-SQL Server. T-SQL language: basic elements (data types, batches, variables), modified SQL statements.		
6. T-SQL language. Predefined instructions and functions with special use.		
7. T-SQL language: parameterized queries, user defined functions.		
8. T-SQL language: temporary objects, cursors, views, error handling.		
9. T-SQL language: stored procedures, triggers.		
10. Transactions: introduction, abnormalities of data concurrent access, transaction properties.		

11. Transactions: SQL statements for transactions control, T-SQL commands for transaction management.		
12. Analytical functions and analytical processing.		
13. Hierarchical data and queries. Recursion in databases. Recursive queries. Recursive CTE.		
14. Review. Preparation for the exam.		
Bibliography <ol style="list-style-type: none"> 1. M.V. Mannino, Database Design, Application Development, & Administration, McGraw Hill, 2007. 2. P. Rob, C. Coronel, Database Systems: Design, Implementation and Management, Course Technology Ptr, 2006. 3. P. Leblanc, A. Jorgensen, J. Chinchilla, J. Segarra, A. Nelson, Microsoft SQL Server 2012 Bible, John Wiley & Sons, 2012. 4. S. Varga, D. Cherry, J. D'Antoni, Introducing Microsoft SQL Server 2016 Mission-Critical Applications, Deeper Insights, Hyperscale Cloud, Microsoft Press, 2016 		
Online references <ol style="list-style-type: none"> 5. http://helios.utcluj.ro/learn2code 		
8.2 Laboratory	Teaching methods	Notes
1. Using SSMS: create a database, tables, insert data, modify data, data constraints, modify tables structure using standard SQL. Assign project themes.	Didactic and experimental proof, didactic exercise, team work	Working on the computer using a DBMS and a programming environment.
2. SQL language: simple queries, simple joins, complex joins (inner joins, outer joins).		
3. SQL language: outer joins, nested queries, sub-queries.		
4. T-SQL language: local variables, parameterized queries, cursors, user defined functions.		
5. T-SQL language: views, stored procedures.		
6. T-SQL language: triggers, transactions, error handling.		
7. Evaluation of projects.		
Bibliography <ol style="list-style-type: none"> 1. M.V. Mannino, Database Design, Application Development, & Administration, McGraw Hill, 2007. 2. P. Rob, C. Coronel, Database Systems: Design, Implementation and Management, Course Technology Ptr, 2006. 3. P. Leblanc, A. Jorgensen, J. Chinchilla, J. Segarra, A. Nelson, Microsoft SQL Server 2012 Bible, John Wiley & Sons, 2012. 4. S. Varga, D. Cherry, J. D'Antoni, Introducing Microsoft SQL Server 2016 Mission-Critical Applications, Deeper Insights, Hyperscale Cloud, Microsoft Press, 2016 		
Online references <ol style="list-style-type: none"> 5. http://helios.utcluj.ro/learn2code 		

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

The discipline content and the acquired skills agree with the expectations of the professional competences acquired will be used in the following COR occupations (Electronics Engineer; Telecommunications Engineer; Electronics Design Engineer; System and Computer Design Engineer; Communications Design Engineer) or in the new occupations proposed to be included in COR (Sale Support Engineer; Multimedia Applications Developer; Network Engineer; Communications Systems Test Engineer; Project Manager; Traffic Engineer; Communications Systems Consultant).

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The level of acquired theoretical knowledge and practical skills	Written test (grid test with 30 questions ; one query involving multiple tables) (T=1...10). Scientific papers (S=1...10)	E = 50%
10.5 Seminar/ Laboratory	The level of acquired knowledge and abilities	Project developed during the semester in the laboratory (P = 1...10)	P = 50%
10.6 Minimum standard of performance			
<p>Qualitative point of view</p> <p>Minimal theoretical and practical knowledge:</p> <ul style="list-style-type: none"> ✓ Understanding of the analysis, modeling and design of databases, database management ✓ Ability to design and implement database SQL applications <p>Minimal acquired competences:</p> <ul style="list-style-type: none"> ✓ Ability to use knowledge of basic and advanced design databases. ✓ Use of SQL language to create database applications. <p>Quantitative point of view</p> <ul style="list-style-type: none"> ✓ The final grade (N) is calculated as the average of marks obtained in the evaluation of ongoing activities and application type: $N = (E + P) / 2$. The condition for obtaining the ECTS credits is that both components of the final grade to be higher than or equal to 5 (five). 			

Date of filling in:	Responsible	Title First name SURNAME	Signature
20.06.2024	Course	Professor Petre G. POP, Ph.D.	
	Applications	Professor Petre G. POP, Ph.D.	

Date of approval in the Council of the Communications Department 10.07.2024	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval in the Council of the Faculty of Electronics, Telecommunications and Information Technology 11.07.2024	Dean Prof. Ovidiu POP, Ph.D.