SYLLABUS

1. Data about the program of study

1.1	Higher Education Institute	Technical University of Cluj-Napoca
1.2	Faculty	Electronics, Telecommunications and Information Technology
1.3	Department	Communications
1.4	Study domain	Electronics and Telecommunications Engineering
1.5	Study level	Master
1.6	Study program/ Qualification	Multimedia Technologies/ Telecommunications / Master
1.7	Type of education	IF (Full-time learning)
1.8	Discipline code	TM-E04.00/ TC-E16.50

2. Data about the subject

2.1	Discipline name					Relational Databases					
2.2	Subject area					Electronics and Telecommunications Engineering					
2.3	Responsible					Professor Petre G. POP, Ph.D. petre.pop@com.utcluj.ro					
2.4	Titular					Professor Petre G. Pop, Ph.D.					
2.5	Year of study	1	2.6	Semester	1	2.7	Assessment	Exam	2.8	Subject category	DA/DI

3. Estimated total time

Year/ Sem.	Subject name	No. of weeks	Course [hours/ week]	Applications [hours/ week]			Course [hours/ semester]	Applications [hours/ semester]			Indiv. study	TOTAL	Credits
				S	L	P		S	L	P			
I/1	Relational databases	14	2	0	1	0	28	0	14	0	58	100	4

3.1	Number of hours per week	3	3.2	course	2	3.3	applications	1
3.4	Total hours per curriculum	42	3.5	course	28	3.6	applications	14

Individual study	Hours
Manual, lecture material and notes, bibliography	18
Supplementary study in the library, online and in the field	18
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	12
Tutoring	7
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	C/C++ Programming, Object Oriented Progrmming
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	Video-projector, screen, whiteboard
5.2	For the applications	PCs with Internet access

6. Specific competences

Professional competences	Theoretical knowledge (What do the student should know)	The students will know: - Knowledge of general databases concepts - Knowledge of relational data model - Database design - Standard SQL and Transact SQL Language - Database management in MS-SQL Server
	Acquired skills (What the student is able to do)	The students will be able to: - Perform conceptual modelling - Design, implement and populate relational databases (tables, constraints, data) - Management of a database using MS SQL Server - Write simple and advanced SQL queries - Design and implement database objects: user defined functions, stored procedures, cursors, views, triggers - Transactions management - Write SQL applications that exploits a database
	Acquired abilities (what equipment/ instruments/ softwares the student is able to	The students will be able to: - To know and use the main features of a management system database - Test and debug SQL applications on databases
Transversal competences		CT3 Adapting to new technologies, professional and personal development through continuing education using electronic documentation and printed sources, in Romanian and in at least one international language (English). Competencies for analysis and synthesis and optimization systems thinking. Flexibility in thinking and ability to work with interdisciplinary concepts and tools.

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

7.1	General objectives	Develop skills in : - analysis, modeling, design of databases - database management - design and implement database SQL applications.
7.2	Specific objectives	Assimilation of theoretical and practical knowledge of basic and advanced design and database administration; use of SQL language to create database applications.

8. Contents

8.1. Lecture (syllabus)		Teaching methods	Notes
1	Database fundamentals: introduction, database management systems, data models, entity-relationship model.	Presentation, heuristic conversation, exemplification, problem presentation, teaching exercise, case study, formative evaluation	Use of .ppt presentation, projector, blackboard
2	The relational model: relations, representing relations through tables, integrity constraints, primary key, foreign key.		
3	The relational model: maintaining referential integrity, transition from conceptual model to the logical model, relation indexing.		
4	SQL Language: introduction, SQL data types, SQL statements, SQL defined functions.		
5	SQL language: SELECT statement, creating queries.		
6	SQL Language: unions, intersections, differences, subqueries, joins.		
7	The MS-SQL Server. T-SQL language: basic elements (data types, batches, variables), modified SQL statements.		
8	T-SQL language: modified SQL statements, parameterized queries, temporary objects, cursors.		
9	T-SQL language: stored procedures, user defined functions.		
10	T-SQL language: triggers, views, error handling.		
11	Relational database design: steps, conceptual design, logical design, physical design, normal forms.		
12	Transactions: introduction, abnormalities of data concurrent access, transaction properties, SQL statements for transactions control, T-SQL commands.		
13	An introduction to BI (Business Inteligence)		
14	Review. Preparation for the exam.		
8.2. Applications (lab)		Teaching methods	Notes
1	Case study: identifying entities, attributes, domains, relationships.	Didactic and experimental proof, didactic exercise, team work	Working on the computer using a DBMS and a programming environment.
2	Transition from conceptual to relational model. SQL language: create tables, populate tables with data, changing the structure of tables and updating data using SQL statements. Assign project themes.		
3	SQL language: simple queries, joins, nested queries, sub-queries.		
4	T-SQL language: local variables, parameterized queries, temporary tables, cursors.		
5	T-SQL language: user-defined functions, stored procedures.		
6	T-SQL language: views, triggers.		
7	T-SQL language: transactions. Evaluation of projects.		

Bibliography

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. Stacia Varga, Denny Cherry, Joseph D'Antoni, Introducing Microsoft SQL Server 2016 Mission-Critical Applications, Deeper Insights,Hyperscale Cloud, Microsoft Press, 2016

On-line references

1. Laboratory support materials available on laboratory site (https://helios.utcluj.ro/learn2code)

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

Acquired skills will be needed in the following possible COR occupations: electronics engineer, telecommunications engineer, system and computer design engineer, or new occupations proposed to be included in COR (sales support engineer, developer of multimedia applications, network operating engineer, test engineer, project manager, traffic engineer, communications system consultant).

10. Evaluations

Activity type	10.1	Assessment criteria	10.2	Assessment methods	10.3	Weight in the final grade
Course		Written test (grid test with 30 questions; one query involving multiple tables) (T=1...10). Scientific papers (S=1…10)		Written test (T=50%) + activity during the semester (S=50%) E = T + S		E = 50%
Applications		Project developed during the semester in the laboratory (P = 1...10)		Project defended at the end of semester		P = 50%
10.4 Minimum standard of performance						
The final grade (N) is calculated as 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
01.02.2020

Course responsible
Professor
Petre G. POP

Teachers in charge of applications
Professor
Petre G. POP

Date of approval in the department
01.10.2020

Head of Communications Department
Professor Virgil DOBROTA, PhD