COURSE DESCRIPTION

1. Information about the programme

1.1 Institution of higher education	**Alexandru Ioan Cuza University of Iasi**
1.2 Faculty	**Faculty of Economics and Business Administration**
1.3 Department	**Department of Accounting, Information Systems and Statistics**
1.4 Field of study	**Business Informatics**
1.5 Level	**Master**
1.6 Study programme/ Qualification	**Software Development and Business Information Systems**

2. Information about the course

2.1 Course name	**Database Administration**						
2.2 Course coordinator	**Associate Prof. Cătălin Strîmbei, Ph.D.**						
2.3 Seminar coordinator	**Ionuț HRUBARU, George Daniel TALABĂ**						
2.4 Year of study	I	2.5 Semester	II	2.6 Type of assessment	P	2.7 Discipline status	**E**

* *C – Compulsory / E - Elective*

3. Total estimated time (hours allocated to didactic activity per semester)					
3.1 Total number of hours per week	3	of which: 3.2 lecture	1	3.3 seminar/lab	2
3.4 Total number of hours in the curriculum	42	of which: 3.5 lecture	14	3.6 seminar/lab	28
Time distribution					hours
Study of the handbook, coursebook, bibliography and notes					**30**
Additional research in the library, online and on the field					**15**
Preparation of seminars/labs, homeworks and projects					**40**
Tutorials					**15**
Assessment					**8**
Other activities.....					
3.7 Total number of self-study hours					**108**
3.9 Total number of hours per semester					**150**
3. 10 Number of credits					**6**

4. Prerequisites (if applicable)

4.1 curriculum-based	• Databases (or similar)
4.2 competence-based	• SQL

5. Conditions (if applicable)

5.1. for lectures	• Lecture rooms shall be provided with video projector

5.2. for seminars/labs	• IT services of the faculty will provide a real or virtual machine with Oracle Database Server • Students are invited to bring and use their own laptops with Database Server (Oracle DB), SQL Developer • Labs will have enough computers for students not owning a laptop • Lab computets will have installed a real or virtual machine Oracle DB Server and Oracle SQL Developer Tool

6. Assimilated specific competences	
Professional competences	• C2.2 Selection and refinement of the methods and techniques for data modeling, persistence, query and analysis, according to the nature of problems and available resources (3) • C2.3 Assess the degree of information integrity and validity for organizational data; find the appropriate tools for administration and analysis of business data (2) • C4.5 Write the specifications and deploy the modules regarding data, applications and services integration (0.5)
Transversal competences	• CT3 – Continuous improvement of specific skills and knowledge towards approaching information systems, development of new software technologies and management of information systems. (0.5)

7. Discipline objectives (provided by the assimilated specific competences grid)	
7.1 The general objective of the discipline	• To provide the core knowledge, methodologies and tools in order to create optimized physical database schemas and to implement security and availability assurance policies and strategies.
7.2 Specific objectives	• Knowledge of database servers internal architecture. • Knowledge of and skills to design optimal database storage structures. • Knowledge and skills to audit and tune database server activity parameters. • Knowledge and skills for implementing business rules regarding security and backup&recovery requirements.

8. Content		
8. 1 Lecture	Teaching methods	Observations
Chapter 1. Database System Architecture 1.1 Overview on DBMSs/Database Servers Functional and Organization structures 1.2 Oracle DBMS Specific Structural Features: instance and background processes, SQL processing	Course lecture, explanation, conversation, questioning.	4 hours (2 lectures)

1.3 Oracle DBMS Specific Structural Features: tablespaces, segments, extents and data blocks 1.4 Oracle DBMS Specific Structural Features: indexes types and storage 1.5 Oracle DBMS Specific Structural Features: tables, partitioning and storage		
Chapter 2. SQL Database Physical Design 2.1 Goals and objectives of database physical design 2.2 Database Design Process: macro process and micro process 2.3 Physical Design principles and decisions: Query execution plan and index design 2.3 Physical Design principles and decisions: table storage design 2.3 Physical Design principles and decisions: de-normalization techniques	Course lecture, diagrams, explanation, conversation, questioning. Case study.	4 hours (2 lectures)
Chapter 3. Database System Transactions and Concurrency 3.1 Transactional support structures 3.2 Applying ACID principles on database systems 3.3 Oracle blocking options	Course lecture, code execution, explanation, conversation, questioning. Case study.	2 hours (1 lectures)
Chapter 4. Backup, recovery and security 4.1 Database systems monitoring activities and tools 4.2 Database availability and recovery 4.3 Oracle audit and security options 4.4 Oracle database backup and recovery options	Course lecture, explanation, conversation, questioning, Case study.	4 hours (2 lectures)
8. 2 Seminar/lab	Teaching methods	Observations
Physical Database Environment settings. Create physical schema	Practical Case Discussion, Individual Practical Project-1st stage	5 labs
Performance testing framework. Experiment optimization techniques	Practical Case Discussion, Individual Practical Project-2nd stage	4 labs
Design and implement Database Security and Audit policies	Practical Case Discussion, Individual Practical Project-3rd stage	2 labs
Implement backup and recovery procedures	Practical Case Discussion, Individual Practical Project-4th stage	3 labs

Bibliography

Craig S. Mullins, *Database Administration: the complete guide to practices and procedures*, Second Edition, Addison-Wesley, 2013
Thomas Kyte and Darl Kuhn*, Expert Oracle Database Architecture*, Third Edition, Apress, 2015
Lahdenmaki, Tapio, Leach, Michael, *Relational database index design and optimizers: DB2, Oracle, SQL server et al*, John Wiley & Sons, 2005
Bob Bryla, Kevin *Loney Oracle Database 11g DBA Handbook*, (Oracle Press), McGraw-Hill Osborne Media, 2008
Harrison, Guy, *Oracle performance survival guide: a systematic approach to database optimization*, Prentice Hall, 2009
Allen, Grant, Bryla, Bob, Kuhn, Darl, *Oracle SQL Recipes: A Problem-Solution Approach*, Apress, 2009
Caffrey, Mellanie et.al. *Expert Oracle Practices: Oracle Database Administration from the Oak Table*, Apress, 2010
Tony Hasler, *Expert Oracle SQL Optimization, Deployment, and Statistics*, Apress, 2014
Christian Antognini, *Troubleshooting Oracle Performance*, Apress, 2014
Robert G. Freeman, Matthew Hart, *Oracle RMAN 11g Backup and Recover*, 2010, The McGraw-Hill Companies, Inc. (Publisher)
Paul Wright, *Protecting Oracle Database 12c*, 2014 Apress
Fotache, Marin, Strîmbei, Cătălin, Creţu, Liviu *Oracle9i2: dezvoltarea aplicaţiilor profesionale*, Polirom 2004
Date, C.J. *An introduction to Database Systems Eighth Edition*, Addison-Wesley 2004
Connolly, Thomas M., Begg, Carolyn E. *Database systems: a practical approach to design, implementation and management, third edition*, Addison-Wesley Pearson Education Lmt., 2002
Fotache, Marin *Proiectare bazelor de date: normalizare şi postnormalizare, implementări SQL şi Oracle*, Polirom 2005

9. Corroboration of the discipline content with the expectations of epistemic community representatives, professional associations as well as of representative employers in the programme related field.

10. Assessment			
Type of activity	10.1 Assessment criteria	10.2 Assessment methods	10.3 Share of final grade
Quiz Test Evaluation			25%
Project	• The physical schema • Tuning • Security and Backup-Restore	Real-world application, complexity, validity	75%
10.6 Minimum performance standard			
• Minim 5 for the final grade.			

Date of completion

Lecture Coordinator
Assoc.Prof. Cătălin Strîmbei, Ph.D.

Seminar Coordinators
Ionuț HRUBARU,
George Daniel TALABĂ

Date of approval within the department

Head of Department
Prof. Florin Dumitriu, Ph.D.