MODELLO D (inglese)	
General Information	Academic Year 2019-20
Academic subject	Advanced Databases
Degree course	Laurea Magistrale in Computer Science (LM18)
Curriculum	complementary course
ECTS credits	6
Compulsory attendance	No
Language	English

Subject teacher	Name Surname	Mail address	SSD
	Ezio Lefons	ezio.lefons@uniba.it	INF/01

ECTS credits details			
Basic teaching activities	T1 (Less.): 4	T2 (Ex/Lab): 2	T3 (Project): 0

Class schedule	
Period	I semester
Year	Second Year
Type of class	Lectures(4 credits) – lab/practical exercises (2 credits)

Time management	
Hours	150 (= 6 credits per 25 hours/credit)
Hours of lectures	100 (= 32 h. of lectures + 68 h. of individual study)
Tutorials and lab	50 (= 30 h. of lab/exercises + 20 h. of personal work)

Academic calendar	
Class begins	23th September 2019
Class ends	10th January 2020

Syllabus	
Prerequisites/requirements	database systems (recommended)
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	*Knowledge and understanding* The student will know in depth methods and fundamentals of DBMS optimizers and distributed DBMS ones, as well as methods of data analysis in medium/large information system environments. In particular, those systems oriented to decisional support and based on approximate answers by using data synopses instead of real answer to queries against the store data. Furthermore, he/she will know advanced methods for the communication among the system, the database language, and the embedded language, as well as the advanced characteristics of Sql3. *Applying knowledge and understanding* The student will be able to apply the acquired knowledge to the design and management of information systems based on some of the methodologies presented in the course, as well as to critically analyze advanced models and methods, evaluate alternative solutions or extensions, and performances. *Making informed judgements and choices* The student will be able to evaluate how the trade-off between performance and usage of resources will impact on the development of the database. This will also be facilitated by interacting with other students during the design development or study case. *Communicating knowledge and understanding* The student will be able to properly and critically document the possible choices of the data distribution topology in the network. He/she will be able to illustrate the skills to optimize data queries in order to minimize the use of computing resources, memory, and

	data transmission lines. In the final examination of profit, the achievement of an adequate level of communicative competence will also be evaluated. *Capacities to continue learning* The student will learn the ability to design and implement autonomously graphs of distribution, fragmentation and replication of data on the network, the usage of statistical data on stored data in order to improve subsequent accesses and then develop and refine the ability to play the role of database and/or information system administrator. He/she will also know the objectives and needs of decision-making users as different from those of users of traditional database systems. Finally, he/she will be able to keep him/her-self updated independently of the continuous and constant technological evolution of the topics and contents of the course, both for the theoretical aspects and for the new solutions deriving from the most recent products available on the market.
Contents	1. *Computational completeness of SQL2.* Embedded SQL: Static and Dynamic – Languages with API Interfaces. 2. *SQL3.* Triggers – Active databases – Sql3 Standard. 3. *Query Optimization.* Equivalence mappings of the relational algebra expressions – Optimization of the relational algebra expressions: algebraic-based methods and execution cost-based methods – Statistical profile of relations – Internal representation of queries. 4. *Distributed Databases.* Client-server architectures – Data fragmentation – Execution strategy tree and optimization of the distributed transactions. 5. *Complex applications design.* Approximate answer query systems for decisional users.
Course program	
Bibliography	R.A. Elmasri, S.B. Navathe, (Pearson Italia) *Sistemi di basi di dati: fondamenti*, 5ª - 6ª ed., 2007 – 2010; *Sistemi di basi di dati: complementi*, 4ª ed., 2005. *Fundamentals of Database Systems*, 6th ed., Addison Wesley 2010. P. Atzeni et al., (McGraw-Hill Italia) *Basi di Dati: modelli e linguaggi di interrogazione*, 3ª ed., 2009; *Basi di Dati: architetture e linee di evoluzione*, 2ª ed., 2007; *Basi di Dati*, IV-V eds., 2014-2018.
Notes	Course textbooks are integrated by teacher's materials. E. Lefons, (http://www.di.uniba.it/~lefons/dispense/BDA.htm) *Advanced Database lectures,* 2016 (in Italian); *Relational Algebra Complements: optimization,* 2016 (in Italian).
Teaching methods	Traditional lessons, lectures, and laboratory on methodologies and techniques of decision support systems.
Assessment methods (indicate at least the type written, oral, other)	Presentation and discussion of the project / case study (optional). Oral exam on the contents of the course.
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are.	The assessment of learning will already take place in progress with the assessment of the student's ability to autonomy and coordination with other students during practical and laboratory exercises. The presentation and discussion of an optional project / case study will also aim to assess the degree of professionalism achieved by the student in presenting and supporting the validity of the results achieved, and will be a requirement for obtaining an evaluation of excellence in the oral examination. The exam will evaluate the student's ability to illustrate the fundamental concepts introduced in the course and to critically discuss the various methods of query optimization and network data distribution. The knowledge of the approximate answer methodologies to data queries by decision-makers will also be verified.
Further information	