Database design and administration

Academic Year: (2021 / 2022)　　　　　　　　　　　　　　　　**Review date: 04-06-2021**

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: IGLESIAS MAQUEDA, ANA MARIA

Type: Compulsory ECTS Credits : 6.0

Year : 5 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)
　Files and Data bases (Year 2; Term 2)

OBJECTIVES
　Learning outcomes:

R1. Knowledge and understanding: Have basic knowledge and understanding of the scientific and technological foundations of Computer Engineering, as well as a specific knowledge of computer science, computer engineering and information systems.
R2. Engineering Analysis: To be able to identify Computer Engineering problems, recognise their specifications, establish different resolution methods and select the most appropriate one for their solution, taking into account the social, human health, environmental, and commercial constraints applicable in each case.
R4. Research and Innovation: Be able to use appropriate methods to carry out research and make innovative contributions in the field of Computer Engineering.
R5. Engineering Applications: Graduates will be able to apply their knowledge and understanding to solve problems, conduct research and design devices or processes in the field of Computer Engineering in accordance with criteria of cost, quality, safety, efficiency, respect for the environment and ethical implications. These skills include knowledge, use and limitations of computer systems, process engineering, computer architectures, computational models, equipment, practical work, technical bibliography and information sources.
R6. Transversal Competences: To have the necessary skills for the practice of engineering in today's society. The graduate will have the
abilities to work effectively both individually and in teams, showing communication and team coordination skills. Furthermore, they will demonstrate an awareness of the responsibility of engineering practice, social and environmental impact, and a commitment to
professional ethics, and standards of engineering practice. Finally, they will demonstrate skills and competencies related to best practices in project management, their tools and risk analysis.

Basic and General Competences:
CGB4 - Basic knowledge on the use and programming of computers, operating systems, databases and software with application in engineering.
software with application in engineering.
CG5 - Use computer tools, general purpose, collaborative and work optimization tools for the effective planning and implementation of projects.
implementation of projects.
GC7 - Be able to present and discuss proposals in teamwork, demonstrating personal and social skills that allow them to assume different responsibilities within the same team.
GC9 - Efficiently use ICT means to write technical reports and project and work reports on Computer Science, as well as quality presentations.
CGO9 - Ability to solve problems with initiative, decision-making, autonomy and creativity. Ability to know how to communicate and transmit the knowledge, skills and abilities of the profession of Technical Engineer in Computer Science.

Specific competences:
CECRI5 - Knowledge, administration and maintenance of computer systems, services and applications.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Database Design Methodologies
2. Fundamentals of Database Administration
3. Physical design of databases
4. Database Settings
5. Paradigms and Database Architectures.

LEARNING ACTIVITIES AND METHODOLOGY

* Lectures: 0.9 ECTS. They aim to achieve the specific cognitive competences of the subject, as well as the transversal competences of analysis and abstraction.
* Practical classes: 0.9 ECTS. They aim to initiate the development of the specific instrumental competences, as well as the transversal competences problem solving and application of knowledge.
* Continuous assessment exercises: 1 ECTS. Initiated during practical classes and completed outside of them, they aim to complete the development of the specific instrumental competences and initiate the development of the specific attitudinal competences, as well as the transversal competences problem solving and application of knowledge.
* Practical work: 1.7 ECTS. Developed without the presence of the teacher, they aim to complete and integrate the development of all the specific and transversal competences, in the resolution of two practical cases where the approach to the problem, the choice of the method of resolution, the results obtained and their interpretation are well documented.
* Tutoring classes: 1 ECTS. Individual (individual tutorials) or group (group tutorials) assistance to students by the lecturer.
* Final exam: 0.5 ECTS. Its aim is to influence and complement the development of specific cognitive and procedural skills. It especially reflects the use made of the master classes.

ASSESSMENT SYSTEM

Exercises and examinations are both learning and evaluation activities. The evaluation system includes the assessment of guided academic activities and practical cases, with the following weights:

1) Guided academic activities 10%
- Present teacher: Critical discussion of different solutions to a given problem and public presentation of solutions.
- Absent teacher: Solution to given problems on design and management strategies.
2) Practical case related to DB Design, Implementation and Administration: 60%
3) Final Exam: 30%. A minimum score of 5 up to 10 is required in this test to take into account the continous assessment

% end-of-term-examination:	30
% of continuous assessment (assigments, laboratory, practicals…):	70

BASIC BIBLIOGRAPHY

 - Pramod J. Sadalage & Martin Fowler NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Addison-Wesley Professional, 2012
 - Andreas Meier & Michael Kaufmann SQL & NoSQL Databases: Models, Languages, Consistency Options and Architectures for Big Data Management, Springer, 2019
 - Craig Mullins Database Administration: The Complete Guide to Practices and Procedures, Addison-Wesley Professional, 2012
 - Date, C.J. An Introduction to Database Systems (8th Edition), Prentice Hall (2004).

 - Oracle Oracle Administración de Oracle 10G, http://download-uk.oracle.com/docs/cd/B19188_01/doc/B15921/toc.htm.
 - Oracle Oracle Database Administrator Guide. 11g. Release2 , http://docs.oracle.com/cd/E11882_01/server.112/e25494.pdf, 2014
 - R Ramakrishnan, J Gehrke Database Management Systems - 3rd Edition, McGraw-Hill, 2013

 - Saeed K. Rahimi, Frank S. Haug Distributed Database Management Systems, IEEE Computer Society, 2010

 - Thomas LaRock DBA Survivor: Become a Rock Star DBA, ebook, 2014

ADDITIONAL BIBLIOGRAPHY

 - A. de Miguel, P. Martínez, E. Castro, J.M: Cavero, D. Cuadra, A. Iglesias, C. Nieto Diseño de Bases de Datos: Problemas Resueltos, RA-MA (2001).
 - Biju Thomas OCA: Oracle Database 12c Administrator Certified Associate Study Guide, Wiley / Sybex, 2014

 - D. Cuadra, E. Castro, A. Iglesias, P. Martínez, F.J. Calle, C. de Pablo, H. Al-Jumaily y L. Moreno

Desarrollo de Bases de Datos. Casos Prácticos desde el análisis a la implementación (1ª edición), RA-MA, 2007

 - De Miguel, A. y Piattini, M. Fundamentos y Modelos de Bases de Datos, RA-MA (1999).

 - Elmasri y Navathe Fundamentals of Database Systems, fourth edition, Pearson Addison Wesley, (2003).

 - Levene, M. y Loizou, G. A Guided Tour of Relational Databases and Beyond, Springer Verlag (1999).

 - Silberschatz, A.; Korth, H.; Sudarshan, S. Fundamentos de bases de datos (5ª edición), McGraw-Hill /Interamericana Mexico (2005).