

69322 - Information systems in medicine

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	547 - Master's in Biomedical Engineering
ECTS	3.0
Course	1
Period	Second semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process of this course is based on:

- The presentation of contents by the professors.
- The personal study by the students and the presentation of exercises in class.
- The completion of practical assignments by the students, oriented by the professors, who will develop the theoretical knowledge acquired.

It must be taken into account that, although the course has a practical orientation, acquiring the needed theoretical knowledge is also required. Therefore, the learning process emphasizes both the theoretical concepts and the

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individualized study as well as the development of the practical work. Reading some research papers and analyzing and presenting them will complete the learning process.

5.2.Learning activities

The program helps achieving the expected learning goals by including the following activities...

- A01: Participative theory class (22 hours planned). Exposition by the professors of the main contents of the course and their application to the resolution of problems and cases with the participation of students. This activity will take place in the classroom.
- A02: Lab assignments (4 hours planned). The goal is that students acquire basic knowledge of the standard query language SQL to interact with DBMS and the use of simple development tools. This activity will take place in computer labs.
- A03: Development of a practical assignment, with the goal of applying the knowledge acquired. It will imply designing and implementing the basic aspects of a database (conceptual design, relational design, and implementation in SQL of a minimum set of queries over that database) corresponding to an easy problem of information management related to bioengineering.
- A04: Reading and oral presentation of one or more research papers related to some of the topics of the course.
- A06: Tutoring. Personalized attention to students with the goal of revising and discussing materials and topics presented in theoretical classes and lab sessions.
- A08: Evaluation. Set of written theoretical-practical tests and presentation of reports or assignments used to evaluate the progress of students. More details are provided in the evaluation section.

5.3.Program

- Databases and Database Management Systems
 - o Concept of database. Abstraction levels and data models.
 - o The Database Management System (DBMS).
- Conceptual level of a database: the entity-relationship model
 - o Entity-relationship model. E-R diagrams.
 - o Design of databases using the extended entity-relationship model.
 - o Application to the design of biomedical databases.
- The relational approach
 - o The relational model.
 - o Relational languages: SQL.
 - o Design of relational databases: normalization.
- Advanced concepts of databases
 - o Integrity and security.
 - o Recovery and concurrency control.
 - o Object-oriented databases.
- Medical ontologies
 - o Knowledge representation.
 - o Ontology description languages. Reasoners.
 - o Examples of ontologies.
 - o Integration of distributed biomedical data.
 - o Distributed databases. Federated databases.
 - o Data warehouses. Data mining.
 - o Web Information Systems.

5.4.Planning and scheduling

The calendar of classes, lab sessions and exams, as well as the dates of delivery of evaluation assignments, will be announced in advance, according to the sessions and dates established by the School.

5.5.Bibliography and recommended resources

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BB Elmasri, Ramez. Fundamentos de sistemas de bases de datos / Ramez Elmasri, Shamkant B. Navathe ; traducción, José Manuel Díaz . - 5ª ed. Madrid [etc.] : Pearson Addison Wesley, D.L. 2007

BB Silberschatz, Abraham. Fundamentos de bases de datos / Abraham Silberschatz, Henry F. Korth, S. Sudarshan ; revisión técnica Jesús Sánchez Allende . - 6ª ed. Aravaca (Madrid) : McGraw-Hill Interamericana, D. L. 2014

BC Gómez-Pérez, Asunción. Ontological Engineering / Asunción Gómez-Pérez; Mariano Fernández-López; Oscar Corcho London : Springer Verlag, 2003