

# Bachelor in Computer Science Engineering

## Course information

Year 2018-19

GENERAL SPECIFICATIONS			
<b>English name</b>			
Information Systems – Design & Development			
<b>Spanish name</b>			
Diseño y Desarrollo de Sistemas de Información			
<b>Code</b>		<b>Type</b>	
606010212		Compulsory	
<b>Time distribution</b>			
	<b>Total</b>	<b>In class</b>	<b>Out class</b>
Working hours	150	60	90
<b>ECTS: 6</b>			
<b>Standard group</b>	<b>Small groups</b>		
	<b>Classroom</b>	<b>Lab</b>	<b>Practices</b>
<b>3</b>		<b>0</b>	<b>0</b>
<b>Departments</b>		<b>Knowledge areas</b>	
<b>Year</b>		<b>Semester</b>	
3º		1º	

TEACHING STAFF			
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SPECIFIC INFORMATION OF THE COURSE
<b>1. Contents description</b>
1.1. In English:
Information Systems – Design & Development studies the Information System, focused on the design and implementation of databases. To do this, the following contents will be developed: <ul style="list-style-type: none"> <li>– Architectures, features, components and types of information systems.</li> <li>– Conceptual and logical database design.</li> <li>– Implementation of procedures for an efficient database access.</li> </ul>
1.2. In Spanish
En líneas generales, la asignatura “Diseño y Desarrollo de Sistemas de Información” estudia los Sistemas de Información, haciendo especial hincapié en el diseño e implementación de bases de datos. Para ello, se desarrollarán los siguientes contenidos: <ul style="list-style-type: none"> <li>– Construcción, depuración y ejecución de programas para el acceso y gestión de la información almacenada en una base de datos.</li> <li>– Restricciones de integridad y lógica de negocio a distintos niveles: conceptual, lógico, físico o de aplicación.</li> <li>– Persistencia de objetos en bases de datos relacionales.</li> </ul>

- Modelos de bases de datos orientados a objeto y objeto-relacionales
- Sistemas de información: arquitecturas, características, componentes y tipos.
- Programación en el ámbito web orientados al desarrollo de sistemas de información.
- Diseño conceptual de sistemas de información basándose en metodologías de análisis conjunto de datos y aplicaciones.
- Desarrollo y despliegue de aplicaciones de sistemas de información

## 2. Background

### 2.1. Situation within the Degree:

Information Systems – Design & Development is a 3rd-year, 1st-semester course where the student will gain knowledge about database design, data models and their implementation in a DBMS. In the subject "Databases", (2<sup>nd</sup> year, 2<sup>nd</sup> semester) relational model is studied in depth. This knowledge is needed to understand the relation between the conceptual data modeling and the logical data model. On the other hand, in the subject "Introduction to Software Engineering", the foundations of design and development of software projects is studied.

### 2.2. Recommendations:

No recommendations

## 3. Objectives (as result of teaching):

Information Systems – Design & Development has as main objectives to provide the student with a general vision of information systems and to provide the necessary mechanisms for the design and access to the databases. Through the study of this subject, the student will learn to:

- Design and develop applications and information systems that interact with databases, ensuring their reliability, safety and quality.
- Analyze and design the conceptual and logical model of a database.
- Know the main characteristics and applications of object-relational databases.

## 4. Skills to be acquired

### 4.1. Specific Skills:

CC01: Ability to design, develop, select and evaluate applications and computer systems, ensuring their reliability, safety and quality, in accordance with ethical principles and current legislation and regulations.

CC05: Knowledge, administration and maintenance of computer systems, services and applications.

CC12: Knowledge and application of the characteristics, functionalities and structure of the databases, which allow their proper use, and the design and analysis and implementation of applications based on them.

CC13: Knowledge and application of the necessary tools for storage, processing and access to Information Systems, including web-based ones.

### 4.2. General Skills:

CB1 -

CG0 - Ability to analyze and synthesize: Find, analyze, critique (critical reasoning), relate, structure and synthesize information from various sources, as well as integrate ideas and knowledge.

G03 - Ability to solve problems

G06 - Capacity for autonomous learning as well as initiative and entrepreneurial spirit

G08 - Ability to adapt to technologies and future environments by updating professional skills.

## 5. Training Activities and Teaching Methods

### 5.1. Training Activities:

- Evaluation activities and self-evaluation
- Practical sessions in specialized laboratories
- Problem Solving Sessions
- Lecture

### 5.2. Teaching Methods:

- Participatory magisterial class.
- Development of practices in specialized laboratories or computer classrooms in small groups.
- Problem solving and practical exercises.
- Presentation, Implementation, tutoring and presentation of works.
- Evaluations and exams.

### 5.3. Development and Justification:

In each participatory magisterial class, main concepts of each subject will be explained.

The practices of this subject will consist in the realization of a project of design and development of a system of information accessed, programmatically, to a database.

Also, several partial test will be done. The final evaluation of the subject will take into account the evaluation of the theoretical exam, the project of the subject and partial tests, as detailed in the "Systems and Assessment Criteria" section

This subject has a web site, where students can consult the material to prepare each class, as well as the necessary documentation for each practical session. Students who wish may bring material to the class (books, laptops, etc.).

## 6. Detailed Contents:

### Topic 1. What is an Information System?

- Information systems
- Databases and Information Systems

### Topic 2. Conceptual Data Model and Logical Data Model

- Conceptual Data Modeling Elements: Entity-Relationship Model
- The Enhanced Entity Relationship model
- Design Considerations
- Mapping EER model to relations

### Topic 3. Object Relational Mapping

- Introduction to ORM
- Object persistence

### 7.1. Basic Bibliography

Database Systems: A Practical Approach to Design, Implementation, and Management, Fourth Edition  
Thomas M. Connolly, Carolyn E. Begg  
Pearson Educacion, 2014

Sistemas de bases de datos. Un enfoque práctico para diseño, implementación y gestión (4ª edición)  
Thomas M. Connolly, Carolyn E. Begg  
Pearson Educacion, 2006  
[http://columbus.uhu.es/record=b1370230~S1\\*spl](http://columbus.uhu.es/record=b1370230~S1*spl)

Beginning Java Databases, 2002  
Kevin Mukhar, Todd Lauinger, John Carnell, James R. De Carli, Mark Mamoner, Nitin Nanda, Damon Payne, Joel Peach  
ISBN-10: 1861004370  
ISBN-13: 978-1861004376

Fundamentos de bases de datos con Java  
Kevin Mukhar  
Anaya Multimedia, 2002

### 7.2. Additional Bibliography:

Fundamentals of Databases Systems (Sixth Edition)  
Ramez A. Elmasri, Shamkant B. Navathe  
Addison Wesley, 2011

Fundamentos de Sistemas de Bases de Datos (3ª edición)  
Ramez A. Elmasri, Shamkant B. Navathe  
Addison Wesley, 2002  
[http://columbus.uhu.es/record=b1341702~S1\\*spl](http://columbus.uhu.es/record=b1341702~S1*spl)

## 8. Systems and Assessment Criteria

### 8.1. System for Assessment:

- Examination of theory / problems
- Defense of practice
- Individual monitoring (partial tests)

### 8.2. Assessment Criteria and Marks:

The final grade will be obtained as follows:

$$0.6 * PA + 0.3 * PB + 0.1 * PC$$

PA= Theoretical-Practical Exam. Consistent in a test where the student will have to solve different problems and/or theoretical questions. CC01, CC05, CC12, CC13, CB1, CG0 y CG03

PB = Practical defense in computer science classroom. CC01, CC05, CC12, CC13, CG0, CG03 y CG08

PC = Partial test. CG03 y CG06

Note that is mandatory to have at least a 3 over 10 in PA and PB