

University of Puerto Rico  
 Mayagüez Campus  
 College of Engineering  
 Department of Electrical and Computer Engineering  
 Bachelor of Science in Computer Engineering

**Course Syllabus**

**1. General Information:**

Alpha-numeric codification: ICOM 5016  
 Course Title: Database Systems  
 Number of credits: 3  
 Contact Period: 3 hours of lecture per week  
 Elective in ICOM

**2. Course Description:**

**English:** Database System Architecture. Database Design. Conceptual and Representational Models. Object-oriented Database Modeling and The Uml Language. The E-r Model. Relational Model. Uml Mappings to Relational. The Sql Language. Functional Dependencies and Normalization. Database Application Design and Implementation. Transaction Processing.

**Spanish:** Arquitecturas de Sistemas de Bases de Datos. Diseno de Bases de Datos Modelos Conceptuales y Representacionales. Modelado Orientado A Objetos. el Lenguaje Uml. el Modelo Er. Modelo Relacional. Transformaciones Uml A Relacional. el Lenguaje Sql. Dependencias Funcionales y Normalizacion. Diseno e Implementacion de Aplicaciones de Bases de Datos. Procesamiento de Transacciones.

**3. Pre/Co-requisites and other requirements:**

Prerequisite ICOM 4035  
 Co-requisite ICOM 5007

**4. Course Objectives:**

Students will learn how to develop database applications, starting with the E-R model, then mapping it to the relational model, and implementing this latter model with an application. Students will also gain an understanding of basic database management systems architectures.

**5. Instructional Strategies:**

- conference discussion computation laboratory
- seminar with formal presentation seminar without formal presentation workshop
- art workshop practice trip thesis special problems tutoring
- research other, please specify:

**6. Minimum or Required Resources Available:**

Students will use the Departmental computer laboratories to complete course projects.

**7. Course time frame and thematic outline**

<b>Outline</b>	<b>Contact Hours</b>
Introduction to Database Systems and DBMS Architectures	2
Web-based Application Development for Databases	3
E-R Model and UML	5
Relational Model and Algebra	6
E-R to Relational Mappings	2
Structured Query Language (SQL)	6
Normalization and Integrity	3
Storage and File Systems	3
Indexing and Access Methods	2
Query Evaluation and Optimization	3
Transaction Processing	5
Concurrency Control	2

Exams	3
<b>Total hours: (equivalent to contact period)</b>	45

**8. Grading System**

Quantifiable (letters)  Not Quantifiable

**9. Evaluation Strategies** (Suggested): The faculty member teaching the course will provide the student with the evaluation strategy he/she will be using throughout the semester. This will be done within the first week of classes.

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	3	45%
<input checked="" type="checkbox"/> Final Exam	1	20%
<input type="checkbox"/> Short Quizzes		
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects	variable	35%
<input type="checkbox"/> Journals		
<input type="checkbox"/> Other, specify:		
<b>TOTAL:</b>		<b>100%</b>

**10. Bibliography:**

Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, Database Systems Concepts, 5th Ed., McGraw-Hill, 2005

Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, 4th Ed.

Addison-Wesley, 2004

**11. According to Law 51**

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

**12. Contribution of Course to meeting the requirements of Criterion 5:**

Math	Basic Science	General	Engineering Topic
			√

**12. Course Outcomes**

**Map to Program Outcomes**

- |   |     |
|---|-----|
| 1. Describe and analyze the E-R model for a given enterprise.                                     | (a) |
| 2. Design an E-R Model from a set of customer requirements.                                       | (c) |
| 3. Describe and analyze a relational schema that is compliant with a given E-R Model.             | (a) |
| 4. Design a mapping of an E-R model into a relational schema.                                     | (c) |
| 5. Use SQL to create a relational schema and formulate queries against it.                        | (c) |
| 6. Implement a relational application based an E-R model and its corresponding relational schema. | (e) |

Person (s) who prepared this description and date of preparation: Manuel Rodríguez. Submitted by: Manuel Rodríguez, may 2007