CIIC 4060 - Course Syllabus

1. **General Information:**

   Alpha-numeric codification: CIIC 4060
   Course Title: Database System
   Number of credits: 3
   Contact Period: 3 hours of lecture per week

   Equivalent Course: ICOM 5016

2. **Course Description:**

   English: Study of database system architectures, design and implementation of database applications, conceptual and representational models, SQL and the relational model, functional dependencies and normalization, transaction processing.

   Spanish: Estudio de arquitecturas de sistemas de bases de datos, diseño e implantación de aplicaciones de bases de datos, modelos conceptuales y representacionales, SQL y el modelo relacional, dependencias funcionales y normalización, procesamiento de transacciones.

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

   Prerequisite: CIIC 4020 or ICOM 4035
   Corequisite: CIIC 4050 or 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**

Outline	Contact Hours
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
Total hours: (equivalent to contact period)	45

8. **Grading System**

☒Quantifiable (letters) ☐ Not Quantifiable

9. **Evaluation Strategies**

	Quantity	Percent
☒ **Exams**	3	45%
☒ **Final Exam**	1	20%
☐ **Short Quizzes**		
☐Oral Reports		
☐ **Monographies**		
☐ **Portfolio**		
☒ **Projects**	1	35%
☐Journals		
☐Other, specify:		
TOTAL:		**100%**

10. Bibliography:

1. Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, *Database Systems Concepts*, 6th ed., McGraw-Hill, 2010.
2. Ramez Elmasri and Shamkant Navathe, *Fundamentals of Database Systems*, 6th ed., Addison-Wesley, 2010.
3. David M. Kroenke and David Auer, *Database Concepts*, 6th ed., Prentice Hall, 2012.
4. C.J. Date, *SQL and Relational Theory: How to Write Accurate SQL Code*, 2nd ed., O'Reilly Media, 2011.

11. Course Outcomes

Upon completion of this course the student will be able to:	Program Outcomes
1. explain the relational model of data, and write relational expressions that represent data retrieval, or data modification operations.	1
2. explain and write relational schemas and expressions in the Structured Query Language (SQL)	6
3. design and implement an application based on an E-R model and its corresponding relational schema with SQL	2, 5, 8
4. explain and write ACID transactions statements to create reliable and recoverable updates operations on the tables	6
5. Explain and use the internal storage, indexing, and search structures required to support efficient query processing in modern database engines	6

12. 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 (Office #4) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

13. Academic Integrity

-The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Students General Bylaws (Board of Trustees Certification 13, 2009-2010) states that academic dishonesty includes, but is not limited to: fraudulent actions; obtaining grades or academic degrees by false or fraudulent simulations; copying the whole or part of the academic work of another person; plagiarizing totally or partially the work of another person; copying all or part of another person answers to the questions of an oral or written exam by taking or getting someone else to take the exam on his/her behalf; as well as enabling and facilitating another person to perform the aforementioned

behavior. Any of these behaviors will be subject to disciplinary action in accordance with the disciplinary procedure laid down in the UPR Students General Bylaws.⸻