ESCUELA SUPERIOR POLITÉCNICA DEL LITORAL
Faculty of Electrical and Computer Engineering
COURSE SYLLABUS
Database Systems I

1. CODE AND NUMBER OF CREDITS

CODE:	FIEC05553	
NUMBER OF CREDITS: 5	**Theoretical: 4**	**Practical: 1**

2. COURSE DESCRIPTION

In Database Systems I the Entity Relationship methodology is used to design tables for a database with respect to a business model. We examine how to design a database under different normal forms. It manipulates tables or relations through the operations defined in relational algebra and the commercial relational query language SQL is used on the logical data model to a business model. Through a project the student can make transactions comparable to those performed in the market enterprises or other institution.

3. PRE-REQUISITES AND CO-REQUISITES

PRE-REQUISITES	FIEC04622 Object Oriented Programming
CO-REQUISITES	

4. CORE TEXT AND OTHER REQUIRED REFERENCES FOR THE TEACHING OF THE COURSE

CORE TEXT	1. Ramakrishnan y Gehrke, Administración de Sistemas de Bases de Datos, 3ra Edición, 2002, McGraw-Hill
REFERENCES	1. Connolly y Begg, Sistemas de Bases de Datos, 5ta Edición, 2009, Pearson Education 2. Kroenke, Procesamiento de Bases de Datos, Fundamentos, Diseño e Instrumentación, Quinta Edición, Prentice may

5. COURSE LEARNING OUTCOMES

At the end of the course, the student will be able to:
1. Design objects and transactions in a database involved in the representation of one or more processes of a business model, using data modeling techniques.
2. Define the objects in a database corresponding to the logic involved in a process through the entity-relationship methodology.
3. Examine how to design a database under different normal forms
4. Manipulate tables or relationships through the operations defined in relational algebra.
5. Use the commercial operations language SQL on the logical data model from a business model.
6. Allow the student, through a project, to perform transactions comparable to the ones made by business or other institutions.

6. COURSE PROGRAM

I. INTRODUCTION (1 session – 2.5 hours)
- RDBMS Technology
- RDBMS Evolution
- Client/Server: Components
- Glossary of terms used in databases

II. CONCEPTUAL MODEL: ENTITY (2 sessions - 5 hours)
- Characteristics of the entity
- Attributes
- Primary key
- Cardinality of attributes
- Attributes domains and restrictions

III. CONCEPTUAL MODEL: RELATIONSHIP (2 sessions - 5 hours)
- Relationship definition
- Relationship cardinality
- Supertype-subtype relationship

- Dependency relationship
- Recursive relationship
- Ternary Relationship
- Relationship attributes: 1:1,1:M, M:M and ternary

IV. LOGICAL DATA MODEL (3 sessions – 7.5 hours)
- Tables, columns, rows and fields (first normal form)
- Primary Key and Foreign Key definition
- Conversion of entities of the conceptual model
- Relationships conversion
- Special relationships conversion
- Resolution of the location of the attributes of the relationship
- Data Dictionary

V. NORMALIZATION (3 sessions - 7.5 hours)
- Functional Dependency
- First normal form
- Second normal form
- Third Normal Form
- Boyce-codd normal form
- Fourth normal formal
- Advanced Normalization

VI. RELATIONAL ALGEBRA (3 sessions – 7.5 hours)
- Definition of tuple
- Basic operations between tables (relationships)
- Compound Operators
- Aggregate Functions

VII. SQL (DATA RETRIEVE LANGUAGE) (4 sessions - 10 hours)
- Conversion of relational algebra operations in SQL
- Retrieve Operations (select)
- Column Operations
- Table Operations
- Types of Joins
- Range Variables
- Subquery
- Expressions of special restriction
- Aggregate operators
- Group by and Having

VIII. SQL (DATA MANIPULATION LANGUAGE) (3 sessions – 7.5 hours)
- Insert
- Delete
- Update
- Transaction Definition (atomicity, consistency, isolation, durability)
- Commit and RollBack

IX. SQL (DATA DEFINITION LANGUAGE) (4 sessions -10 hours)
- Create, drop and alter
- Views
- Index
- Triggers
- Stored procedures

X. SQL (DATA CONTROL LANGUAGE) (3 sessions – 7.5 hours)
- Levels of RDBMS security
- Connection security: Connect and disconnect
- System privileges: Grant and revoke
- Object privileges: Grant and revoke

7. **WORKLOAD: THEORY/PRACTICE**

The class schedule during the first part takes place in the classroom in 2 sessions that have a total of 5 hours. The class schedule for the second part is done in the computer lab in 2 sessions that have a total of 5 hours.

8. CONTRIBUTION OF THE COURSE TO THE EDUCATION OF THE STUDENT

The course content is designed to enable students to build a database.
Students using the methodology of Entity Relationship, design a database and define the objects in the database system through the Structured Query Language.
Students analyze and design a system according to actual requirements of a small organization.
The languages that are used in this area are:
SQL (required)
XHTML
Java
JSP.

BASIC TRAINING	PROFESSIONAL TRAINING	SOCIAL SKILLS DEVELOPMENT
	X	

9. THE RELATIONSHIP BETWEEN THE LEARNING OUTCOMES OF THE COURSE AND THE LEARNING OUTCOMES OF THE DEGREE PROGRAM

LEARNING OUTCOMES OF THE DEGREE PROGRAM*	CONTRIBUTION (High, Medium, Low)	LEARNING OUTCOMES OF THE COURSE**	THE STUDENT MUST:
a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline;	High	3,4	Optimize the number of tables, columns and relationships in a logical Entity Relationship Model Using the relational algegra as a tool for solving mathematical SQL
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;	High	1,2,3	Determine the conceptual models of different business models
c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs;	Medium	5,6	Organize the different components of a database system and its interaction with other services
d) An ability to function effectively on teams to accomplish a common goal;	Low	6	Analyze, design and implement solutions as a member of a workgroup.
e) An understanding of professional, ethical, legal, security and social issues and responsibilities;	Low	5	Analyze the security levels of access that database systems have.
f) An ability to communicate effectively with a range of audiences;	---		
g) An ability to analyze the local and global impact of computing on individuals, organizations, and society;	---		
h) Recognition of the need for an ability to engage in continuing professional development;	---		
i) An ability to use current techniques, skills, and tools	High	6	Implement projects whose advances are presented throughout the course

necessary for computing practice.			through and final project deliverables. The underpinnings are carried out in the computer lab or classroom.
j) Ability to lead, manage and undertake projects.	---		

10. EVALUATION IN THE COURSE

Evaluation activities	
Exams	**X**
Tests	**X**
Homework/tasks	**X**
Projects	**X**
Laboratory/Experiments	
Class participation	**X**
Visits	
Other	**X**

11. PERSON RESPONSIBLE FOR THE CREATION OF THE SYLLABUS AND THE DATE OF ITS CREATION

Created by	Vanessa Cedeño Mieles
Date	03/05/2013

12. APPROVAL

ACADEMIC SECRETARY OF THE ACADEMIC DEPARTMENT	DIRECTOR OF TECHNICAL ACADEMIC SECRETARY
NAME: Sra. Leonor Caicedo G.	NAME: Ing. Marcos Mendoza V.
SIGNATURE:	SIGNATURE: ESCUELA SUPERIOR POLITECNICA DEL LITORAL
Date of approval by the Directive Council: 2013-334 2013-08-12	Ing. Marcos Mendoza V. DIRECTOR DE LA SECRETARIA TÉCNICA ACADÉMICA

13. VALIDITY OF THE SYLLABUS

RESOLUTION OF THE POLYTECHNIC BOARD:	13-10-269
DATE:	2013-10-17