

COURSE DESCRIPTION

Department and Course Number: COMP 6120

Course Title: Database Systems I

Total Credits: 3

Required: No

Prerequisites: COMP 3270

Class meetings per week: 3 hours

Lab meetings per week: 0 hours

Course Coordinator: Dr. Juan Gilbert

Date Prepared: February 20, 2004

Current Catalog Description:

Theoretical and applied issues related to the analysis, design, and implementation of relational database systems.

Textbooks:

Ramakrishnan, Raghu, and Gehrke, Johannes. 2003. *Database Management Systems, 3rd Edition*. McGraw-Hill. ISBN 0-07-115110-9.

References:

None.

Course Objectives:

1. Understand issues related to the design and implementation of relational database systems.
2. Be able to develop a semantic data model based on high-level requirements.
3. Be able to develop a relational database model given a semantic data model and high-level requirements.
4. Be able to implement a relational database using a current relational database management system and related tools.
5. Be able to analyze a relational design on the basis of functional dependencies and other relational integrity constraints.
6. Understand design trade-offs related to structure and performance of relational database systems.
7. Understand fundamental file organization and physical implementation issues for relational database systems.
8. Understand issues related to application development for relational database systems.

Prerequisites by Topic:

1. Fundamental programming and software development
2. Familiarity with a variety of fundamental data structures and algorithms

Topics Covered: (specify number of hours on each)

1. Overview of database systems (2 hours)
2. Database design and entity relationship modeling (4 hours)

3. Overview of the relational model (4 hours)
4. Relational algebra (3 hours)
5. SQL (6 hours)
6. Functional dependencies (3 hours)
7. Normal forms (4 hours)
8. Database application development (5 hours)
9. Internet applications (3 hours)
10. Indexing and storage (3 hours)
11. Query evaluation and optimization (3 hours)
12. Security (2 hours)
13. Exams (3 hours)

Laboratory Projects: (specify number of weeks on each)

1. Relational database design and implementation project (5 weeks)

Oral and Written Communications:

None.

Social and Ethical Issues:

Although not a formal part of the course, social and ethical issues related to database systems (e.g., privacy) are discussed as a part of appropriate course lectures.

Theoretical Content:

Relational theory (e.g., functional dependencies, Armstrong's Axioms, normal forms, decomposition algorithms) is a major component of the course.

Problem Analysis and Solution Design:

All students are required to develop a relational database system based on high-level requirements as a course project. Semantic analysis and modeling skills are developed and applied to create an entity relationship model for a database system. Design skills are developed and applied to create a relational design from the semantic model. Relational constraints and design metrics (e.g., normal forms) are developed and applied to the design. As part of the course project, students are responsible for specifying the problem his/her project solves, identifying constraints and design trade-offs, and justifying design and implementation decisions.

