COMPSCI 410: Databases
3-credit course with 3 lecture hours per week
Course Coordinator: Jyh-haw Yeh

Textbook(s) and Supplemental Material

Catalog Description
Foundations of database management systems. Database models: relational, object and others. Database design: entity-relationship modeling, logical relational schema design, physical design, functional dependencies and normalization, and database tuning. Database application development using database interfaces embedded in host languages.
PREREQ: COMPSCI 342.

Elective

Goals for the Course
Successful students will be expected to:
- have a conceptual understanding the fundamental issues and problems in the design of database systems
- have a broad knowledge of the relational model (which is currently the most widely used) in considerable depth
- be familiar with an actual commercial language (SQL) used to implement the relational database model
- be familiar with the embedded-SQL
- be able to build and manipulate their own databases through some DBMS

Outcomes Addressed
a. an ability to apply knowledge of computing and mathematics appropriate to the discipline
b. an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
c. an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
h. recognition of the need for and an ability to engage in continuing professional development
i. an ability to use current techniques, skills, and tools necessary for computing practice
j. an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices
k. an ability to apply design and development principles in the construction of software systems of varying complexity

Outcomes Assessed: None

Topics Covered
- Data Modeling - Conceptual ER model
- Data Modeling - Conceptual EER model
- Relational Data Model
- Relational Algebra
Relational Database Design by Mapping from ER/EER to Relational SQL
Embedded SQL
Database application development using C provided API
Functional Dependencies and Normalization
Relational Database Design Algorithms and Further Dependencies
Indexing Structures for Files
Query Processing and Optimization

Grading
A letter grade is assigned to each student at the end of the course based on the numerical scores of these activities:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homeworks and Programming Assignments</td>
<td>40%</td>
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<tr>
<td>Midterm 1</td>
<td>15%</td>
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<tr>
<td>Midterm 2</td>
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<tr>
<td>Final</td>
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Curriculum Category Content (Credits)

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<thead>
<tr>
<th>Area</th>
<th>Core</th>
<th>Advanced</th>
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<tbody>
<tr>
<td>Algorithms</td>
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<tr>
<td>Software Design</td>
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<tr>
<td>Computer Architecture</td>
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<tr>
<td>Data Structures</td>
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<tr>
<td>Programming Languages</td>
<td>1</td>
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