Knight Foundation School of Computing and Information Sciences

Course Title: Information Storage and Retrieval Concepts  
Date: 11/19/09

Course Number: CGS 4366

Number of Credits: 3

<table>
<thead>
<tr>
<th>Subject Area: Database</th>
<th>Subject Area Coordinator: Nagarajan Prabakar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>email: <a href="mailto:prabakar@cs.fiu.edu">prabakar@cs.fiu.edu</a></td>
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Catalog Description:
Introduction to information management and retrieval concepts. The design and implementation of a relational database using a commercial DBMS. Online information retrieval and manipulation. Not acceptable for credit for Computer Science majors.


Prerequisites Courses: COP 3804  
Corequisites Courses: None

Type: Required

Prerequisites Topics:
- Java data types
- Design of Java classes
- Design of basic web pages

Course Outcomes:
1. Be familiar with database architecture
2. Master the design of retrieval queries
3. Master normalization principles
4. Be familiar with the design of a relational database
5. Be familiar with embedded SQL queries
# Outline

<table>
<thead>
<tr>
<th>Topic</th>
<th>Number of Lecture Hours</th>
<th>Outcome</th>
</tr>
</thead>
</table>
| Database systems  
  - Data redundancy  
  - Components of database systems  
  - DBMS functions  
  - Database architecture and data independence | 3 | 1 |
| Relational data model concepts  
  - Relational model introduction  
  - Query by example  
  - Relational algebra | 6 | 2 |
| Structured query language  
  - Simple retrieval queries  
  - Multi-table queries  
  - Nested queries  
  - Insert, delete, update queries  
  - Embedding SQL queries in a procedural language | 8 | 2,5 |
| Relational database design  
  - Views, indexes  
  - Integrity rules: entity, referential  
  - Functional dependency  
  - Normal forms (1NF, 2NF, BCNF)  
  - Multivalued dependency (4NF)  
  - Mapping conceptual schema to a relational schema | 8 | 3,4 |
| DBMS functions  
  - Concurrency, deadlock  
  - Two-phase locking, time stamping  
  - Recovery, Security | 4 | |
| Database administration  
  - Policies: access control, disaster planning, archiving, security  
  - Administrative: DBMS evaluation, selection, maintenance, training  
  - Technical: design, testing, tuning | 4 | |
| Database management approaches  
  - Distributed DBMS, OODB  
  - Data warehouse, data mining, OLAP | 3 | |
Course Outcomes Emphasized in Laboratory Projects / Assignments

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of Weeks</th>
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<tbody>
<tr>
<td>1. Database query design (relational algebra)</td>
<td>2</td>
</tr>
<tr>
<td>Outcomes: 2</td>
<td></td>
</tr>
<tr>
<td>2. Database query design (SQL)</td>
<td>2</td>
</tr>
<tr>
<td>Outcomes: 2</td>
<td></td>
</tr>
<tr>
<td>3. Database query design (advanced SQL)</td>
<td>2</td>
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<tr>
<td>Outcomes: 2</td>
<td></td>
</tr>
<tr>
<td>4. Mapping of a conceptual schema to a relational schema</td>
<td>2</td>
</tr>
<tr>
<td>Outcomes: 3, 4</td>
<td></td>
</tr>
<tr>
<td>5. Embedding SQL queries in an application program</td>
<td>2</td>
</tr>
<tr>
<td>Outcomes: 5</td>
<td></td>
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</tbody>
</table>

Oral and Written Communication: No significant coverage

Number of written reports:

Approximate number of pages for each report:

Number of required oral presentations:

Approximate time for each presentation:

Social and Ethical Implications of Computing Topics

No significant coverage

<table>
<thead>
<tr>
<th>Topic</th>
<th>Class time</th>
<th>Student performance measures</th>
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</thead>
</table>

Theoretical Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>Class time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set theory</td>
<td>0.5</td>
</tr>
<tr>
<td>Relational algebra</td>
<td>0.5</td>
</tr>
</tbody>
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Problem Analysis Experiences

1. 
Solution Design Experiences

1. Mapping a conceptual schema to a relational schema
2. Design of database queries

Assessment Plan for the Course & how Data in the Course are used to assess Program Outcomes

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School’s Assessment Plan: https://abet.cs.fiu.edu/csassessment/