Course Title: Information Storage and Retrieval Concepts

Date: 3/23/12

Course Number: COP 4703

Number of Credits: 3

Subject Area: Database

Subject Area Coordinator:
Nagarajan Prabakar
email: prabakar@cs.fiu.edu

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.

Textbook: Bundle: "Concepts of Database Management" (7th Ed) and "A Guide to SQL" (8th Ed) by Pratt
Thompson Course Technology (ISBN: 0324825838)

Addison Wesley (ISBN: 0136086209)

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
<table>
<thead>
<tr>
<th>Topic</th>
<th>Number of Lecture Hours</th>
<th>Outcome</th>
</tr>
</thead>
</table>
| • Database systems  
  o Data redundancy  
  o Components of database systems  
  o DBMS functions  
  o Database architecture and data independence | 3 | 1 |
| • Relational data model concepts  
  o Relational model introduction  
  o Query by example  
  o Relational algebra | 6 | 2 |
| • Structured query language  
  o Simple retrieval queries  
  o Multi-table queries  
  o Nested queries  
  o Insert, delete, update queries  
  o Embedding SQL queries in a procedural language | 8 | 2,5 |
| • Relational database design  
  o Views, indexes  
  o Integrity rules: entity, referential  
  o Functional dependency  
  o Normal forms (1NF, 2NF, BCNF)  
  o Multivalued dependency (4NF)  
  o Mapping conceptual schema to a relational schema | 8 | 3,4 |
| • DBMS functions  
  o Concurrency, deadlock  
  o Two-phase locking, time stamping  
  o Recovery, Security | 4 | |
| • Database administration  
  o Policies: access control, disaster planning, archiving, security  
  o Administrative: DBMS evaluation, selection, maintenance, training  
  o Technical: design, testing, tuning | 4 | |
| • Database management approaches  
  o Distributed DBMS, OODB  
  o Data warehouse, data mining, OLAP | 3 | |
School of Computing and Information Sciences
COP 4703
Information Storage and Retrieval Concepts

Course Outcomes Emphasized in Laboratory Projects / Assignments

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of Weeks</th>
</tr>
</thead>
<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>
</tr>
<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>
</tr>
</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>
</tr>
</thead>
</table>
School of Computing and Information Sciences  
COP 4703  
Information Storage and Retrieval Concepts

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>
</table>

Problem Analysis Experiences

1.

Solution Design Experiences

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