IST 334
Database Design and Processing
Spring 2015

INSTRUCTOR: Dr. Stephen C. Shih
Professor, School of Information Systems and Applied Technologies

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OFFICE HOURS 9:00 a.m. – 9:30 a.m., Tuesday & Thursday
3:30 p.m. – 5:00 p.m., Tuesday & Thursday

MEETING TIMES / LOCATION
11:00 a.m. – 12:15 p.m. TR / ASA 112C

TEXTBOOK

COURSE DESCRIPTION
This course is designed to provide students with essential knowledge and pragmatic skills of databases modeling, design and processing. Essential topics include database development life cycle, conceptual data modeling, logical database design and normalization, and queries and Structure Query Language (SQL) for data processing and manipulation. For hands-on learning, this course focuses on the use of relational database management systems for constructing database system objects, such as tables, queries, and SQL code. A grade of C or better is required. Prerequisite: ISAT 229. Restricted to IST major.
COURSE OBJECTIVES

Up successfully completion of this course, the students should be able to:

1. Acquire basic knowledge of database development life cycle.
2. Understand fundamental and advanced database modeling and design concepts.
3. Develop Entity-Relationship Diagrams (ERDs) for a database using a given set of business rules and assumptions.
4. Use Microsoft Visio and Microsoft Access to develop ERDs.
5. Perform data analysis and normalization.
6. Develop queries and write Structured Query Language (SQL) statements for a variety of data definition and data manipulation scenarios.

Desire2Learn (D2L) will be employed for both face-to-face and online learning management. It will be used in this class as the primary tool for posting teaching materials and assignments, and in the meantime, for conveying necessary communications among students as well as dialogues between students and instructor. Use the following link to get access to the SIU Online Site powered by D2L: https://online.siu.edu/

DATABASE DESIGN & DEVELOPMENT PROJECT

- You will be working on the project in team of 3 - 4 students, depending on the size of the class. Each student is responsible for finding his/her teammates. As a team, you are responsible for controlling the project schedule and maintaining the quality of the project deliverables.

- Peer review policy – You will be given a “peer review” from time to time to evaluate the performance of your peers. As a team member, you have the right to raise any issues or concerns.

- Whenever necessary, some class sessions will be designated as a “project hour” for project discussions.
**EVALUATIONS**

Your grade will be determined by the percentage of the total points you get. The components of the course grade are:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td><strong>Exams</strong> (400 points)</td>
<td>4 exams: 100 points per exam</td>
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<tr>
<td><strong>Assignments</strong> (300 points)</td>
<td>~ 10 assignments</td>
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<tr>
<td><strong>Database Design &amp; Development Project</strong> (200 points)</td>
<td>- DB modeling &amp; design report: 50 points</td>
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<td>- DB application development: 100 points</td>
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<td>- Final project presentation &amp; computer demonstration: 50 points</td>
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<td>(Peer Evaluation: Part of your final project score will be determined by the peer evaluation results.)</td>
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<tr>
<td><strong>Attendance</strong> (100 points)</td>
<td>Each unexcused absence will lead to a deduction of 5 points</td>
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<td>(See Attendance Policy for details)</td>
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**Grading Scale:**

- A: 90 % and above; B: 80 - 89 %; C: 70 - 79 %; D: 60 - 69 %; F: Below 60%
# TENTATIVE COURSE OUTLINE

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Subjects</th>
<th>Exams / Project</th>
<th>Textbook Reading Assignments</th>
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</thead>
<tbody>
<tr>
<td>1 - 4</td>
<td>The Big Picture</td>
<td>Exam 1 (100 points)</td>
<td>Chapter 1 (Selective Sections)</td>
</tr>
<tr>
<td></td>
<td>• Database Systems</td>
<td></td>
<td>Chapters 2, 3, &amp; 4</td>
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<td></td>
<td>• Database Design</td>
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<tr>
<td></td>
<td>Basic Data Modeling – Part I</td>
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<tr>
<td>5 – 8</td>
<td>Basic Data Modeling – Part II</td>
<td>Exam 2 (100 points)</td>
<td>Chapters 2, 3, &amp; 4</td>
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<td>Advanced Data Modeling</td>
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<td>Chapter 5</td>
</tr>
<tr>
<td>9 - 12</td>
<td>Logical Database Design: Normalization of Database Tables</td>
<td>Exam 3 (100 points)</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>13 - 16</td>
<td>Data Processing with Queries &amp; SQL</td>
<td>Exam 4 (100 points)</td>
<td>Supplementary Material + Selective Sections of Chapters 7 &amp; 8</td>
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<td>17</td>
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<td>Project Presentation</td>
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Detailed List of Course Coverage

I. Database Design and Modeling (75%)

- Database development life cycle
- Database systems
- Conceptual data modeling & ERD
  - Basics: entities, attributes, relationships, connectivity, cardinality, and keys
  - Selection of primary keys
  - Assignment of foreign keys
  - Special topics:
    - Resolving the issue of multivalued attributes
    - Resolving the issue of many-to-many relationships (covering the use of associative/composite entity)
    - Uses of surrogate keys
    - Uses of composite keys
    - Referential integrity
  - Strength of relationships (existence dependence, identifying relationships, weak entities, etc.)
  - Relationship degree
  - Advanced data modeling:
    - Unary 1:M relationships
    - Unary M:N relationships
    - Supertype-subtype relationships
      - Specialization hierarchy
      - Inheritance
      - Subtype discriminator
      - Disjoint & overlap constraints
      - Completeness constraints
    - Implementing 1:1 relationships
- Logical database design
  - Functional dependency analysis & functional dependency diagramming
  - Data manipulation anomaly analysis
  - Normalization: 1NF, 2NF, 3NF, BCNF and 4NF (covering concepts of repeating group, partial dependency, and transitive dependency.)

II. Queries and SQL (25%)

- Basics of queries and Structure Query Language (SQL)
- SELECT statement
POLICIES

Attendance

Attendance is MANDATORY for all students. The attendance will be taken 5 - 10 minutes after the class starts. **Note that those who are not present throughout the *entire* class session (i.e., arriving late for more than 15 minutes or leaving early) will be deemed as absent.**

A **100-point attendance credit** is given to each student at the beginning of the semester. Each unexcused absence will lead to a **deduction of 5 points** unless there is a documented illness or emergency.

The absent student will be responsible for the materials, assignments and/or announcements missed.

Students may be granted emergency or planned excused absences under the following circumstances:

- **Emergency Excused Absences:** For an emergency excused absence, the student must contact the instructor to obtain approval. Students may be granted emergency excused absences under special circumstances, such as personal illness (a doctor’s excuse is needed if the student is away for 2 days or longer) or death or serious illness of a close family member.

- **Planned Excused Absences:** For a planned excused absence, the student must contact the instructor at least one week prior to the start of the course regarding the absence. You may be granted planned excused absences when involving in a scholarly activity (e.g., making an academic presentation at a regional or national conference). Time away from class must be minimal and, preferably no more than 2 days. Planned excused absences are not permitted during examination days or project presentation days, except under unusual circumstances.

Academic Dishonesty

All assignments, projects and exams should reflect individual effort. **Any incident of plagiarism or cheating will result in an automatic course failure for *all* involved parties.** All matters pertaining to academic dishonesty will be dealt with according to School, College and University guidelines.

Statement on Academic Honesty/Plagiarism – See the Morris Library Guide on Plagiarism (http://libguides.lib.siu.edu/plagiarism)

As defined by the SIUC **Student Conduct Code**, acts of academic dishonesty include, but are not limited to:

1. **Plagiarizing** or representing the work of another as one’s own work;
2. Preparing work for another that is to be used as that person’s own work;
3. Cheating by any method or means;
4. Knowingly or willfully falsifying or manufacturing scientific or educational data and representing the same to be the result of scientific or scholarly experiment or research;
5. Knowingly furnishing false information to a university official relative to academic matters;
6. Soliciting, aiding, abetting, concealing, or attempting acts of academic dishonesty.

Professional Conduct

Students are expected to conduct themselves in a professional and courteous manner, which includes but is not limited to the following:

- Arrive at class on time.
- Do not leave early unless you have notified the instructor in advance with a legitimate reason.
- Turn off cell phones before entering the classroom.
- Do not do things (e.g., writing e-mails, web surfing, or doing homework assigned in other classes) unrelated to the subjects discussed in class.
- Loud talking or any other inappropriate disruptive behaviors in not allowed in the classroom.
- Be respectful toward your instructor and classmates.

Unprofessional conduct may, at the instructor’s discretion, lead to a deduction of the student’s final grade.

Email Communication

Students are responsible for checking the course D2L website frequently.

ACADEMIC CALENDAR

SPRING SEMESTER 2015

Martin Luther King, Jr.'s Birthday Holiday  Monday, January 19
Semester Classes Begin  Tuesday, January 20
Spring Vacation  Saturday, March 7, 12:00 Noon through Sunday, March 15
Honors Day  Saturday, April 11
Final Examinations  Monday, May 11 through Friday, May 15
Commencement  Saturday, May 16, 2015

All Breaks begin officially at 10:00 p.m. the night before and end at 7:30 a.m. the morning after the respective beginning and ending dates listed, unless otherwise noted.