Database Design & Creation
LIS 674 (Fall 2015)

Final version of this syllabus will be distributed in class

Instructor: Luz. M. Quiroga, Professor
Class meetings: Wednesday 1pm-4pm; Hamilton Library LIS 2K
Course workspace: https://laulima.hawaii.edu
Website: http://www2.hawaii.edu/~lquiroga/courses/lis674/lis674.htm
Office hours: After class or by appointment
Office location/Phone: POST 305E; phone: 956-9988
E-mail: lquiroga@hawaii.edu

Course Description (from UH catalog)

Designing and creating textual and/or directory databases from the viewpoint of information specialists and content providers. Needs analysis, file design, record content and structuring, software choices. Students implement a prototype database.

Detailed Course Description

This is an introductory class on database system. It covers principles of database systems, data modeling, relational models, database design, query languages, query optimization, concurrency control and data security. In addition, fundamentals on systems analysis and the database application lifecycle will be reviewed.

Prerequisite

For LIS students: LIS670 or instructor consent.
For other students: Instructor consent.

Library and Information Science (LIS) Student Learning Outcomes (SLO)

This course addresses the following SLO of the LIS Program, as stated in their mission and goals. The course enables students to:

SLO 1: Understand, apply and articulate the history, philosophy, principles and ethics of library and information science and the related professions.
- 1c) Develop and apply critical thinking skills in preparation for professional practice

SLO 3: Organize, create, archive, preserve, retrieve, manage, evaluate, and disseminate information resources in a variety of formats.
- 3b) Organize, create, archive and manage collections of information resources following professional standards

SLO 4: Evaluate and use the latest information technologies, research findings and methods.
- 4a) Evaluate systems and technologies in terms of quality, functionality, cost-effectiveness and
adherence to professional standards
- 4c) Apply current research findings to professional practice

SLO 5: Engage in projects and assignments dealing with multicultural communities and representing diverse points of view.
- 5b) Demonstrate understanding of the social, cultural, political, and economic context of information services and systems

Course Level Student Learning Outcomes

By the end of this course students will have learned database fundamentals, including:

1. Basic data modeling principles
2. General architecture for database systems - The ANSI-SPARC three level architecture (external, internal and conceptual level)
3. The relational model and languages
4. Phases of database design: conceptual, logical and physical database design
5. The Entity Relationship (ER) model; UML notation
6. Concurrency control and data security
7. Database Management Systems (e.g.: Microsoft Access, MySQL)

Students will also gain practical experience and will be able to:

1. Act as a contributing member of a database design team.
2. Apply various software tools for database design
3. Implement a database prototype which meets users requirements

Professional Expectations

All students attending classes in the LIS Program are expected to become familiar with and adhere to the Professional Code and Expectations posted at http://www.hawaii.edu/lis/students.php?page=profexp.

Teaching Philosophy

I believe in collaborative learning, where we all learn from each other. I also believe that students will benefit from exposure to real life situations, as it will foster their critical thinking. Working in a group helps students to improve their communication skills, which is something highly appreciated by most organizations. I also believe that it is everyone's social responsibility to contribute in developing solutions to some of the problems in our community. As a result, this is project-driven course -- rather than lecture-driven. Students are encouraged to work as a group solving real world, community needs.

Research Methods

Methodologies and procedures for system analysis and research can take different approaches; examples of methods incorporated in assignments and course projects are Survey research, Interviews and Content analysis.

Required Text

- Connolly, Thomas and Carolyn Begg. Database systems a practical approach to design, implementation and management. (5th ed.) Addison Wesley. 2010. Other useful books are available through the Resources link on Laulima, such as links to MySQL documentations, software downloads, tutorials, webinars, etc.

Course Structure

Class meetings will combine lectures, demos, exercises, presentations and discussions. For each class session, students should have completed the assigned readings, bringing questions and comments to the class. There will be class exercises and minor assignments.

During each class a student will help the instructor to lead, co-teach the session with the instructor.

Students will participate in exploring a special topic in database systems. The results of the special topic analysis will be presented orally to the class.

In addition, early in the semester students will form teams and actually get involved in a real - small
database project of their choice, which will start with requirement analysis, followed by a prototype design and implementation (see descriptions below);

Working in groups for the special topic and / or term project is encouraged.

Class Website: Students will use Laulima to form teams, conduct online discussions of their projects, complement class discussions, etc.

Co-Teaching / Facilitation Work
This is a seminar where your participation is essential for your learning; for each class one student will help the instructor to facilitate / co-teach the session; the facilitator can suggest modifications to the reading list, two weeks in advance; class meetings will combine lecture, demos, lab sessions, presentations and discussions.

Special Topics Research
The special topics research is intended to give an awareness of issues such as alternatives and trends in database design, software tools available, etc. Students will analyze a selected special topic and present the analysis results to the class, including software tool demonstrations, as applicable. Students may find special topic information useful in preparing the course project. Students will negotiate with the instructor the schedule of presentations in order to find the time that will better complement the class matters. Instructor will make some suggestions of possible topics.

Project
Students will work in a team (2-4 students) for the course project during the whole semester and the final product will be a documented database prototype. Students will identify a "client/user" with a problem that can be at least partially solved with the creation of a database. Students will meet the client in order to gather information to define the problem, identify specifications, analyze data, and come up with a database solution. Analysis of user needs and user-based design will be emphasized, what means that the technical solution will have to be adjusted to the client specification - requirements.

Each team has to be ready to spend at least 4 hours per week working in the project. The "client" will have to be willing to meet the students once per week facilitating their data collection and discussing their ongoing, updated, proposals. Hopefully the client will be actively involved as part of the design team. The final project report should be similar to one which would actually be submitted to a client. It should include an executive summary and a description of the problem, requirements, specifications, limitations and the database solution. Modeling tools, diagrams may also prove useful appendices.

The appropriateness of the solution and its justification will be the primary factors in grading. Clarity of expression (including proper use of English, aptness of illustrations, logical organization, etc.) will also be of major concern, and appearance (layout, font selection, paper, print quality, binding, etc.) will also be taken into account). Projects will be presented during the last two weeks of the class. Examples of projects developed in other database classes will be made available. The paper is due on the last day of instruction.

Project Progress Reports
To make the task more manageable, the final project report has been broken down into three project reports (PR), written by the team. Each report will help the group to build the final project report, part by part. With every project report due, students must also provide the project documentation. Project documentation refers to information collected while working on the project, such as field notes, comments, etc. After submission of each progress report, each team should schedule a meeting with the instructor to discuss progress and next steps.

Project Journals
With each project progress report, students will turn in an INDIVIDUAL project journal. The project journals are used to evaluate the student's progress and how well each student is doing. A journal is due at the same time the project progress report is due. Since project journals are individual work, other team members should not read them. Therefore, each student MUST turn in his / her own journal.
**Project Poster**

The group should provide a Power Point file that will contain a single slide that summarizes your project. It can be created from the slides of your project presentation file. Creativity will be needed to make it appealing, yet still informative.

**Communication**

- Work space: This class has a work space in Laulima at [http://Laulima.hawaii.edu](http://Laulima.hawaii.edu) where you can find details and discussions of weekly activities and assignments. Also you will have a space for your group project and special topic planning and follow up.

- File sharing: dropbox or similar system

- Instructor e-mail: Feel free to e-mail me at lquiroga@hawaii.edu. Please start the message subject with "LIS 674".

- Class discussion: for each class session, a forum will be created in Laulima for questions and discussions.

- Group Project discussion: each group will have a group project section, which will be used to discuss ideas with your other group members and the client / mentor

- Special Topic discussion: each group will have a topic forum to discuss ideas and progress

- Client / Mentor Guest Account: The clients can have a guest account on Laulima so that they can communicate with the students and provide feedback on the group projects.

- Online conferences via Skype or similar software could be used to interact with the instructor or classmates.

- Face to face, online (skype) or phone meetings can be set by appointment.

**Technology Requirements**

This course requires use of a computer for most of the assignments and the Internet. Students should be prepared to learn systems, such as Laulima, Microsoft Visio, Microsoft Access, MySQL and/or Microsoft SQL server. You will receive the software needed for the assignments or instructions for downloading them to your own computers. Some of the tools will be available in the LIS and POST computer labs.

**Grading Summary**

**Assignment scoring:**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation: Class attendance, constructive participation, online discussions, leadership</td>
<td>15%</td>
</tr>
<tr>
<td>In-class exercises, assignments, homework</td>
<td>15%</td>
</tr>
<tr>
<td>Co-teaching / Facilitation work</td>
<td>15%</td>
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<tr>
<td>Special Topic - presentation, paper and poster</td>
<td>10%</td>
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<tr>
<td>Revised copy of Special topic (ScholarSpace format)</td>
<td>5%</td>
</tr>
<tr>
<td>Course project:</td>
<td>40%</td>
</tr>
<tr>
<td>In progress project reports and documentation (team) (3 reports)</td>
<td>12%</td>
</tr>
<tr>
<td>Individual journals (3 journals)</td>
<td>3%</td>
</tr>
<tr>
<td>Course project Presentation (team)</td>
<td>5%</td>
</tr>
<tr>
<td>Course project report and poster (team)</td>
<td>10%</td>
</tr>
<tr>
<td>Revised copy of course project report and poster (team; ScholarSpace format)</td>
<td>5%</td>
</tr>
<tr>
<td>Intra-team and mentor evaluations</td>
<td>5%</td>
</tr>
</tbody>
</table>

**Grading Scale:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score Range</th>
<th>Grade</th>
<th>Score Range</th>
<th>Grade</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>100-104</td>
<td>A</td>
<td>95-98</td>
<td>A-</td>
<td>91-92</td>
</tr>
<tr>
<td>B+</td>
<td>90-94</td>
<td>B</td>
<td>85-88</td>
<td>B-</td>
<td>80-82</td>
</tr>
<tr>
<td>C+</td>
<td>80-84</td>
<td>C</td>
<td>75-77</td>
<td>C-</td>
<td>70-72</td>
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<tr>
<td>D</td>
<td>69-74</td>
<td></td>
<td>64-68</td>
<td></td>
<td>63-66</td>
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<tr>
<td>F</td>
<td>62-62</td>
<td></td>
<td>59-59</td>
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<td>59-59</td>
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</tbody>
</table>
Students with special needs

Students with special needs as defined by the Americans with Disabilities Act, should discuss their needs with the instructor at the beginning of the semester, in order to make the necessary arrangements early in advance.

Policies

Class participation, discussion, leadership:

Full credit will be awarded only to students who have near-perfect attendance, participate meaningfully (and non-obstructively) in class discussions, and create an atmosphere of collegial participation when leading discussions.

Missing class policy:

Missing a session affects overall class participation; it will also affect the grade if there happens to be an exercise or quiz during the class. With a valid excuse (e.g. health problems, attending a professional meeting) the student will be asked to post in Laulima a class review or a brief summary (no more than 2 pages) of the meeting attended if it pertains to the course concepts.

Missing class policy:

Late assignments, exercises policy:

• With no valid excuse: the grade for the assignment will be reduced by 20% per each late day.
• With a valid excuse: a fair deadline will be negotiated.

Course Schedule

See the course schedule at http://www2.hawaii.edu/~lquiroga/courses/lis674/lis674courseSchedule.htm
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Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Session</th>
<th>Topics</th>
<th>Readings Connolly &amp; Begg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 26</td>
<td>01</td>
<td>Course introduction and logistics</td>
<td></td>
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<tr>
<td>Sep 2</td>
<td>02</td>
<td>Introduction to databases</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>Sep 9</td>
<td>03</td>
<td>Database environment</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>Sep 16</td>
<td>04</td>
<td>Object-oriented analysis and design</td>
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<tr>
<td>Sep 24</td>
<td>05</td>
<td>The relational model</td>
<td>Chapter 3</td>
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<tr>
<td>Sep 30</td>
<td>06</td>
<td>Fact finding techniques</td>
<td>Chapter 10</td>
</tr>
<tr>
<td>Oct 7</td>
<td>07</td>
<td>Entity-relationship modeling</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>Oct 14</td>
<td>08</td>
<td>Entity-relationship modeling (cont)</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>Oct 21</td>
<td>09</td>
<td>Query by Example (QBE)</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>Oct 28</td>
<td>10</td>
<td>MS Access reports, forms, etc.</td>
<td>Chapter 8 (section 1)</td>
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<tr>
<td>Nov 4</td>
<td>11</td>
<td>SQL: Data Definition Language</td>
<td>Chapters 6</td>
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<td></td>
<td></td>
<td>Nov 11: Holiday (Veteran's Day) Practice MS Access</td>
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<tr>
<td>Nov 18</td>
<td>12</td>
<td>SQL: Data manipulation</td>
<td>Chapters 5</td>
</tr>
<tr>
<td>Nov 25</td>
<td>13</td>
<td>Enhanced entity-relationship modeling</td>
<td>Chapter 12</td>
</tr>
<tr>
<td>Dec 2</td>
<td>14</td>
<td>Normalization</td>
<td>Chapter 13</td>
</tr>
<tr>
<td>Date</td>
<td>Day</td>
<td>Topic</td>
<td>Chapters</td>
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<tr>
<td>Dec 9</td>
<td>15</td>
<td>Security and concurrency control</td>
<td>19 (sections 1, 2, 3)</td>
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<tr>
<td>Dec 16</td>
<td>16</td>
<td>Projects presentations, reports &amp; CDs</td>
<td>20 (sections 1, 2)</td>
</tr>
</tbody>
</table>