

COURSE DESCRIPTION

DEPARTMENT AND COURSE NUMBER CMPS 460 **Course Coordinator** Jim Etheredge

Course Title Introduction to relational database design and implementation **Total Credits** 3

URL <http://www.ucs.louisiana.edu/~jne1390/cs460/cs460.html> **Semester hours** 3

Current Bulletin Description:

Introduction to database design and implementation using the Entity-Relationship model and mapping high-level designs into the relational model. Relational model concepts, relational constraints, and the relational algebra. Database declaration and manipulation using SQL. Embedded SQL and CGI-based database application development. Normalization, optimization, and concurrency control. Prerequisites: CMPS 341, CMPS 351, and MATH 301 with a minimum grade of C; or CMPS405 with a minimum grade of B.

Textbooks

Fundamentals of Database Systems (5E), Elmasri/Navathe, 2007, Addison-Wesley, ISBN: 0-321-369574-2

References

None.

Course Goals

- To gain an understanding of the fundamental concepts of the relational database model.
- To gain experience implementing and accessing relational databases using the SQL standard.
- To gain experience in the development of program that use embedded database calls.
- To gain experience in the design and development of web-based database applications.
- To be exposed to other topics related to relational database management systems as time allows.

Course outcomes

- Students have an understanding of the fundamental concepts of the relational database model.
- Students are able to use SQL to create a database, and add, change, and retrieve data from it.
- Students are able to use a relational database as the primary source of data storage and retrieval for a system.
- Students have experience working in groups to design and develop web-based database applications.

Prerequisites by Topic

- Experience in developing computer solutions to problems.
- Working knowledge of C/ C++ programming.
- Working knowledge of data structures.
- Working knowledge of Unix.

Major Topics Covered in the Course

- Relational database design using ERM (10 hours)
- Relational model concepts (4 hours)
- Relational constraints (2 hours)
- The relational algebra (8 hours)
- Database declaration and manipulation using SQL (10 hours)
- Embedded SQL (4 hours)
- CGI-based database application development (6 hours)
- Relational database normalization (2 hours)
- Quizzes and exams (3 hours)

Laboratory projects (specify number of weeks on each)

- Relational database design (3 weeks)
- Mapping ER diagrams to the relational model (2 week)
- Relational algebra (3 weeks)
- SQL assignments and project (3 weeks)
- Embedded SQL assignment/project (3 weeks)
- Web-based database application development (3 weeks)

Oral and Written Communications

Students are given a project as part of the course requirements. They are required to design, implement, and use a relational database. One of the deliverables for the project is a write-up, which includes the design, any assumptions and a user's guide.

Social and Ethical Issues

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

- Theory of the relational database model
- Entity-relationship Model as a high-level database design tool
- Relational database normalization (and other topics as time allows)

Problem Analysis

Please describe the analysis experiences common to all course sections.

Students must use written descriptions of applications to develop relational database designs. Problem analysis requires students to understand the applications, the relational database model, and how those applications can best be implemented to allow for the storage, retrieval and presentation of the data.

Solution Design

Please describe the design experiences common to all course sections.

Students are given written descriptions of realistic application areas. The students use the entity relational model to determine the entities and the relationships between them. The high-level designs (in the form of ER diagrams) are then mapped into the relational model for actual implementation. Designs are then tested by designing and executing queries against the database.