CSCE 520: DATABASE SYSTEM DESIGN

Catalog Course Description:
520—Database system Design. (3) (Prereq: CSCE 245 or GEOG 563) Database management systems; database design and implementation; security, integrity, and privacy.

Prerequisite(s) By Topic:
Introductory programming and data structures

Textbook(s) and Other Required Material:

Hector Garcia-Molina, Jeffrey D. Ullman, and Jennifer D. Widom, *Database Systems: The Complete Book*, Prentice Hall, Englewood Cliffs, NJ, 2001.

Rajshekhar Sunderraman, *Oracle 9i Programming: A Primer*, Addison-Wesley, Boston, MA, 2003.

Computing Platform: Windows XP/Access; Unix/Oracle

Course Objectives: {Assessment Methods Shown in Braces}
1. Describe the major components of a database management system and state their functions and purpose. {tests}
2. Develop a data model for a database application using an appropriate modeling tool such as ER diagrams {projects}
3. Use the concepts of data normalization to develop well-designed database applications {tests, assignments, projects}
4. Implement a database application using an appropriate relational DBMS {projects}
5. Use SQL to access database information {tests, assignments, projects}
6. Describe major operational issues associated with database applications, including transaction management, security, and integrity. {tests}

Topics Covered:
1. Introduction (2 hours)
2. Relational database management systems: data definition, data manipulation using SQL, system catalog, views, database languages (12 hours)
3. Logical database design: entity-relationship models, normal forms, normalization (10 hours)
4. Relational data model: formal definition, integrity rules, relational algebra and calculus (6 hours)
5. Operational issues: transaction management, recovery and concurrency, security and integrity, database products (8 hours)
6. Reviews, examinations, etc. (4 hours)

Laboratory Projects and Other Student Work:
Students design and implement a small database system in addition to written homework assignments.

Difference between Undergraduate and Graduate Work:

Students enrolled for graduate credit will have to do additional and/or more difficult assignments and will be graded with more rigorous criteria in order to justify the receipt of graduate credit.

Syllabus Flexibility: Medium. The instructor may select a different textbook and change the emphasis on different topics.

Relationship of Course to Program Outcomes:
The contribution of each course objective to meeting the program outcomes is indicated with the scale:
3 = major contributor, 2 = moderate contributor, 1 = minor contributor. Blank if not related.

	Program Outcomes										
Course Objectives	1. Logic & Math	2. Computing Fundamentals	3. Apply Computing Principles	4. Work on teams	5. Communicate Effectively	6. Liberal arts & Soc. Sciences	7. Basic Science and Lab Procedures	8. Learn New Tools & Processes	9. Employed upon Graduation	10. Application Area	11. Electronics and Digital Sys Design
1. Describe the major components of a database management system and state their functions and purpose			3						2		1
2. Develop a data model for a database application using tools such as ER diagrams	2	3	1						2		1
3. Use data normalization to develop well-designed database applications		2	2						2		1
4. Implement a database application using an appropriate relational DBMS			3						3		1
5. Use SQL to access database information			3					3	3		1
6. Describe major operational issues associated with database applications, including transaction management, security, and integrity		1	3						2		

Estimated Computing Category Content (Semester hours):

Area	Core	Advanced	Area	Core	Advanced
Algorithms		1	Data Structures		
Software Design		1	Programming Languages		1
Computer Architecture					

Estimated Information Systems Category Content (Semester hours):

Area	Core	Advanced	Area	Core	Advanced
Hardware and Software			Networking and Telecommunications		
Modern Programming Language			Analysis and Design		1
Data Management		2	Role of IS in an Organization		
Quantitative Analysis			Information Systems Environment		

Oral and Written Communication: None

Social and Ethical Issues:
Security and privacy

Theoretical Content:
Formal data models

Analysis and Design:
Use of entity-relationship models, database design

Class/Laboratory Schedule:
Lecture: 3 periods of 50 minutes or 2 periods of 75 minutes per week

Course Coordinator: Caroline Eastman

Modification and Approval History
Prepared based upon previous descriptions for CSCI 520 (April 1998) and EECE 503 (June 1999, June 2001)
Revised July 2002 to include statement on graduate work
Revised June 2005 by Caroline Eastman to change textbook and to include statement on undergraduate and graduate work.