COURSE INFORMATION FORM

DISCIPLINE: Computer Science & Information Systems
COURSE TITLE: Database Design and Management

CR. HR. 3  LECT HR. 2  LAB HR. 2  CLIN/INTERN HR.  ________  CLOCK HR.  ________

CATALOG DESCRIPTION
Introduction to database design and management. Topics include terminology and concepts, data modeling, database design, relational databases, database query languages, distributed databases, physical database design, security and implementation. Aspects of privacy and ethical issues are discussed. Integrates database theory with a practical hands-on approach.

PREREQUISITES
CSIS 110 or CSIS 115

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)
Upon completion of this course, the student will be able to:
1. Demonstrate basic database terminology and concepts, including data dictionaries.
2. Produce a simple database design.
3. Demonstrate relational and object-oriented database structures.
4. Analyze conceptual, logical and physical data modeling.
5. Demonstrate approaches to structured and object design.
6. Demonstrate access control techniques.
7. Apply design and modeling tools to database development.
8. Develop a project plan and identify functional specifications.
9. Develop database applications.
10. Convert application data from legacy systems.
11. Implement database applications using standard query languages, user interfaces and reports.
12. Explain the application of data repositories, data warehousing and data mining.
13. Explain issues surrounding privacy and ethics.

GENERAL EDUCATION OUTCOMES (ESO)
Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

Outcomes  ESO
2. Critical Thinking  ESO
   B. Define, analyze, and evaluate information, materials and data
      4. Integrate information and see relevant relationships that broaden and deepen understanding  (4)
3. Life-Long Learning  ESO
   C. Attributes of an Awareness of the Convergence of Knowledge
      3. Synthesize information to facilitate application  (11)
PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

1. Use industry specific software and/or apply troubleshooting skills to solve problems.
2. Create and defend solutions to real life business challenges.

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes may be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

Exercises/projects (1-13)
Quizzes/examinations (1-13)
Class discussion/participation (1-13)
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. Introductory Database Concepts
   A. The integrated database environment
   B. Roles in the integrated database environment
   C. Advantages and disadvantages of the integrated database approach
   D. Historical developments in information systems

II. Database Planning and Database Architecture
   A. Data as a resource
   B. Characteristics of data
   C. Stages in database design
   D. Design tools
   E. Database administration
   F. *The three-level database architecture
   G. Overview of data models

III. The Entity-Relationship Model
   A. Purpose of the E-R model
   B. Entities and attributes
   C. Keys and relationships
   D. Roles
   E. E-R diagrams

IV. The Relational Model
   A. Brief history of the relational model
   B. Advantages of the relational model
   C. Relational data structures
   D. Integrity constraints
   E. Views
   F. *Mapping an E-R model to a relational model

V. Normalization
   A. Objectives of normalization
   B. Insertion, update and deletion anomalies
   C. Functional dependency
   D. Superkeys, candidate keys and primary keys
   E. The normalization process
   F. When to stop normalizing

VI. Relational Database Management Systems and SQL
   A. Brief history of SQL in relational database systems
   B. Architecture of a relational database management system
   C. Defining the database using SQL DDL
   D. Manipulating the database using SQL DML
E. Protecting data integrity with constraints and triggers
F. COMMIT and ROLLBACK statements
G. *SQL programming
H. Creating and using views
I. *The system catalog

VII. The Object-Oriented Model
   A. Rational for the object-oriented model
   B. Object-oriented data concepts
   C. *Object-oriented data modeling using UML
   D. *Object Query Language

VIII. Introduction to Database Security
   A. Issues in database security
   B. Physical security and user authorization
   C. Authorization
   D. Access control
   E. Using views for access control
   F. Database security and the Internet

IX. Transaction Management
   A. Properties of transactions
   B. Need for concurrency control
   C. Locking
   D. Need for recovery

X. Social and Ethical Issues
   A. Computerization and ethical issues
   B. Intellectual property
   C. Privacy issues
   D. Human factors