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Course Outline for CIS 9001

DATABASE DESIGN METHODOLOGY

Effective: Spring 2016

I. CATALOG DESCRIPTION:

CIS 9001 — DATABASE DESIGN METHODOLOGY — 2.00 units

This course provides students with a vendor-neutral introduction to and an overview of database systems; including database design, conceptual, logical and physical data modeling, Entity Relationship models. This course includes sections on relational databases, Structured Query Language (SQL) and optimizing databases through normalization. You will apply your knowledge with hands-on labs designed to apply the intricacies of database design methodology.

2.00 Units Lecture

Grading Methods:

Letter or P/NP

Discipline:

	MIN
Lecture Hours:	36.00
Total Hours:	36.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

- A. Identify basic database types and management systems
- B. List common database languages and their purposes, and identify language subsets of Structured Query Language (SQL)
- C. Identify relational data modeling schemas, characteristics and manipulation
- D. Identify the steps of the database planning life cycle
- E. Identify the activities in the conceptual design phase of a database
- F. Apply normalization techniques and processes
- G. Describe logical database design steps and practices
- H. Interpret logical data models into a physical data model that can be implemented by a particular database management system (DBMS)
- I. Identify SQL commands and syntax
- J. Create statements using Data Definition Language (DDL)
- K. Form commands using Data Manipulation Language (DML)
- L. Identify elements of database security

V. CONTENT:

- A. Introduction to Databases
 1. Introduction to Databases
 2. What Is a Database?
 3. File-Based Databases
 4. The Evolution of Databases
 5. Relational Databases and Database
 6. Management Systems (DBMSs)
 7. Origins of Relational Databases
- B. Relational Database Fundamentals
 1. Introduction to Relational Databases
 2. Multitier Database Architecture
 3. Relational Model Terminology
 4. Using Tables to Represent Data
 5. Characteristics of Relations
 6. Data Models
 7. Entities and Data Relationships
 8. Relational Integrity
 9. Database Languages
 10. Data Dictionaries
- C. Database Planning
 1. Introduction to Database Planning
 2. Database Design Life Cycle

- 3. Database Requirements Document
- 4. ProAudio Case Study
- 5. Selecting a DBMS
- 6. Selecting an Application Interface
- D. Overview of Database Design Methodology
 - 1. Introduction to Database Design Methodology
 - 2. Effects of Poor Database Design Practices
 - 3. Database Design Phases
 - 4. Conceptual Database Design
 - 5. Entity-Relationship (ER) Models
- E. Normalization
 - 1. Introduction to Normalization
 - 2. What Is Normalization?
 - 3. Normal Forms
 - 4. First Normal Form
 - 5. Second Normal Form
 - 6. Third Normal Form
 - 7. Boyce-Codd Normal Form (BCNF)
- F. Logical Database Design
 - 1. Introduction to Logical Database Design
 - 2. Logical Database Design
 - 3. Creating a Logical Data Model
 - 4. Using a Database Definition Language
 - 5. Validating the Logical Data Model
 - 6. Defining Integrity Constraints
 - 7. Creating an Enterprise Data Model
- G. Physical Database Design
 - 1. Introduction to Physical Database Design
 - 2. Physical Database Design
 - 3. MySQL Query Browser
 - 4. Creating Enterprise Constraints
 - 5. Using Secondary Indexes
 - 6. Denormalization
 - 7. Creating User Views
 - 8. Designing Database Access Rules
- H. Structured Query Language
 - 1. Introduction to Structured Query Language
 - 2. Language
 - 3. SQL Basics
 - 4. Data Definition Language
 - 5. Data Manipulation Language
 - 6. Retrieving Data from Relations
 - 7. Data Control Language
 - 8. Relational Algebra
 - 9. Introduction to Relational Algebra
 - 10. Defining Relational Algebra
 - 11. Selection
 - 12. Projection
 - 13. Cartesian Product
 - 14. Union
 - 15. Difference
 - 16. Intersection
 - 17. Joins
- I. Transactions and Database Security
 - 1. Introduction to Database
 - 2. Transactions and Security
 - 3. Transactions
 - 4. Concurrency Control
 - 5. Database Security

VI. METHODS OF INSTRUCTION:

- A. Lecture and classroom discussion
- B. Computer demonstrations with overhead display panel
- C. Read text and other supplemental sources (example, Internet sites)
- D. Discussion boards
- E. PowerPoint presentations
- F. Chat rooms
- G. Lab experience: hands-on lab assignments and database creation and manipulation

VII. TYPICAL ASSIGNMENTS:

1. Research the U.S. Department of Labor Bureau of Labor Statistics Occupational Outlook Handbook database job. Write a short summary of your finding, share with discussion board
2. Given the following business requirements develop an initial conceptual database model
3. Develop an Entity Relational Diagram from the info provided
4. Hands-on lab assignment, write the SQL program to: to Display for each employee the employee number, last name, salary, and salary increased by 15% and expressed as a whole number. Label the column New Salary

VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Quizzes
3. Projects

4. Class Participation
5. Lab Activities

B. Frequency

1. Chapter quizzes, examinations (mid-term, final)
2. Weekly hands-on lab assignments to reinforce and demonstrate mastery of the various tools
3. 1-2 individual database projects
4. Active participation on a weekly basis in discussion boards, chats, etc.

IX. TYPICAL TEXTS:

1. Certification Press. *Database Design Specialist: Academic Student Guide*. v1.0 ed., Certification Partners, 2014.
2. Coronel, Carlos. *Database Systems: Design, Implementation, and Management*. 10th ed., Cengage, 2013.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Access to the World Wide Web with any major Web browser