College of San Mateo
Official Course Outline

1. **COURSE ID:** CIS 363 **TITLE:** Enterprise Database Management
   Units: 4.0 units **Hours/Semester:** 48.0-54.0 Lecture hours; 48.0-54.0 Lab hours; and 96.0-108.0 Homework hours
   Method of Grading: Grade Option (Letter Grade or Pass/No Pass)
   Recommended Preparation:
   Completion of CIS 111 or CIS 254. Completion of or concurrent enrollment in CIS 132.

2. **COURSE DESIGNATION:**
   Degree Credit
   Transfer credit: CSU; UC

3. **COURSE DESCRIPTIONS:**
   Catalog Description:
   Comprehensive course in enterprise database management with the open-source Database Systems such as MySQL or PostgreSQL. Covers relational model and theory, forms and theories of normalization, and in-depth SQL. Overview of database administration, stored procedures, functions, triggers, and metadata. Covers DBMS server administration, performance tuning, security, optimization, and database design. Advanced topics include client-server database applications using Java and PHP, dynamic SQL, prepared SQL, and callable statements. Intended for students with previous programming experience.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
   Upon successful completion of this course, a student will meet the following outcomes:
   1. Design and construct database applications of moderate complexity.
   2. Use SQL commands to create tables and to query, update, and drop them.
   3. Explain the relational model and theory of normalization.
   4. Create stored procedures, functions, and triggers.
   5. Administer a Database Management System with ability to backup, recover, and protect data.
   6. Develop an advanced project using a DBMS, such as MySQL or PostgreSQL, with Java or PHP and callable statements.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
   Upon successful completion of this course, a student will be able to:
   1. Design and construct database applications of moderate complexity.
   2. Use SQL commands to create tables and to query, update, and drop them.
   3. Explain the relational model and theory of normalization.
   4. Create stored procedures, functions, and triggers.
   5. Administer a Database Management System with ability to backup, recover, and protect data.
   6. Develop an advanced project using a DBMS, such as MySQL or PostgreSQL, with Java or PHP and callable statements.

6. **COURSE CONTENT:**
   Lecture Content:
   1. Introduction
      A. History of Database Systems
      B. Database Concepts
      C. Relational Model and Theory
      D. DBMS Installation
      E. DBMS Features
   1. SQL Basics
      A. SQL Syntax
      B. Database Creation
      C. Table Management
      D. Data Types
      E. Indexing
      F. Data Management
      G. SQL Operators

H. Queries
I. Transactions
J. Metadata

2. Database Design Fundamentals
   A. Database Concepts
   B. Entities, Attributes, and Relationships
   C. Design Methods
   D. Design Requirements
   E. Functional Dependence
   F. Primary and Secondary Keys
   G. Normalization

3. Database Administration
   A. Defining and Using Views
   B. Using a View to Update Data
   C. Dropping a View
   D. Security
   E. Indexes
   F. System Catalog
   G. Integrity Constraints

4. MySQL Administration
   A. Configuration
   B. Application and Database Server Tuning
   C. Security
   D. Logging
   E. Backup and Recovery

1. MySQL Advanced Topics
   A. Importing Data
   B. Exporting Data
   C. Using the Query Browser
   D. Using the Administrator

2. Database Applications
   A. Architecture
   B. Connections and Transactions
   C. Object-Relational Modeling
   D. Client-Server Applications
      a. Java
      b. PHP
   E. Dynamic SQL
   F. Prepared SQL
   G. Callable Statements
      a. Stored Procedures
      b. Functions
   H. Triggers

Lab Content:

Students will complete lab exercises and will create and work with MySQL databases to reinforce the lecture material.

1. Create tables in MySQL
2. Load data into tables in MySQL
3. Modify data in a MySQL table
4. Perform inner and outer joins
5. Perform SQL queries using PHP
6. Implement constraints
7. Create and use indexes
8. Transactions and triggers
9. MySQL database administration
10. Create data-driven applications using MySQL with PHP or Java

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**
   Typical methods of instruction may include:
   A. Lecture
   B. Lab
   C. Activity
   D. Directed Study
   E. Discussion
   F. Observation and Demonstration
   G. Other (Specify): The course will include the following instructional methods as determined appropriate by the instructor: lecture will be used to introduce new topics; instructor will model problem-solving techniques; class will solve a problem together, each person contributing a potential "next step"; students will participate in short in-class projects (in teacher-organized small groups) to ensure that students experiment with the new topics in realistic problem settings; instructor will invite questions AND ANSWERS from students, generating discussion about areas of misunderstanding; instructor will create and manage an Internet conference for discussion of course topics; and students will work in small groups to solve significant programming assignments.

8. **REPRESENTATIVE ASSIGNMENTS**
   Representative assignments in this course may include, but are not limited to the following:
   Writing Assignments:
   Weekly database programming assignments
   Reading Assignments:
   Reading assignments accompanied by self-test questions and running code samples
   Other Outside Assignments:
   Studying posted lecture notes and relevant handouts. Database programming assignments. The reading assignment frames the concepts covered and provides the basic knowledge necessary to do the self-test questions and understand the sample code. The lecture notes and handouts provide a more in-depth look at topics and distills the information down to what the faculty thinks is most important. The database programming assignments provide hands on practice of the concepts covered in the readings.

9. **REPRESENTATIVE METHODS OF EVALUATION**
   Representative methods of evaluation may include:
   A. Class Work
   B. Exams/Tests
   C. Group Projects
   D. Homework
   E. Lab Activities
   F. Projects
   G. Quizzes
   H. Written examination
   I. Bi-weekly quizzes to provide feedback to students and teacher; Short answer - from textbook material, Midterm and Final exams; and general problem solving (similar to in-class work), short program segments (similar to database development assignments) Assessment of group participation on course projects, including peer-assessment of participation and contribution to the group effort.

10. **REPRESENTATIVE TEXT(S):**
    Possible textbooks include:
    A. Vanier. *Mastering MySQL 8*, 1st ed. Packt Publishing, 2018
    B. Mehta, Bhavsar, et al. *MySQL 8 Administrator's Guide*, 1st ed. Packt Publishing, 2018
    C. Zhang. *Practical Guide for Oracle SQL, T-SQL and MySQL*, 1st ed. CRC Press, 2018
    D. Silberschatz, Korth and Sudarshan. *Database System Concepts*, 7th ed. ed. McGraw-Hill, 2019

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Course Originator: Mounjed Moussalem