June 22, 2011

METROPOLITAN STATE COLLEGE *of* DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of: <u>Letters, Arts and Sciences</u>

Department: <u>Mathematical and Computer Sciences</u>

Prefix & Course Number: <u>CS 3810</u>   **Crosslisted With*:** _____

Course Title: <u>Principles of Database Systems</u>

Check All That Apply: Required for Major: _____   Required for Minor: _____   Specified Elective: _____

                                            Required for Concentration: _____   Elective: <u>X</u>   Service Course: _____

Credit Hours: <u>4</u> (<u>4</u>+<u>0</u>)

Total Contact Hours per semester (assuming 15-16 week semester):

    Lecture <u>60</u>   Lab <u>0</u>   Internship <u>0</u>   Practicum <u>0</u>   Other (please specify type and hours): <u>0</u>

Schedule Type(s): <u>L</u> Grading Mode(s): <u>L</u>

Variable Topics Courses (list restrictions, including the maximum number of hours that can be earned**):

_____
** NOTE: This information must be included in the course description.

Restrictions (Variable Topics Course): _____

Prerequisite(s): <u>CS 2050 and MTH 1410 with grades of "C" or better, or permission of instructor</u>

Corequisite(s): <u>none</u>

Prerequisite(s) or Corequisite(s): _____

Banner Enforced:
        Prerequisite(s): <u>CS 2050 and MTH 1410</u>
        Corequisite(s): _____
        Prerequisite(s) or Corequisite(s): _____

Catalog Course Description:

This course covers the principles and methodologies of database design, and techniques for database application development. The topics covered include relational algebra, SQL queries, normalization, entity-relationship model, SQL/Host-language interface, stored procedure, object-oriented databases, and semi-structured databases.

APPROVED:

Herald Shultz   9/27/2011
Department Curriculum Committee   Date 9/27/11

_____   Date
Department Chair OR Program Director

Linda Lang-Perrotta   10/10/11
Department Chair OR Program Director   Date

Sheila A Thompson   12/16/11
Dean OR Associate Dean   Date

_____   _____
Associate VP, Academic Affairs   Date

*If crosslisted, attach completed Course Crosslisting Agreement Form

Required Reading and Other Materials will be equivalent to:
Garcia-Molina, H, Ullman, J.D., and Widom, J. (2009) *Database Systems: The Complete Book, 2nd edition*,
Prentice Hall, Upper Saddle River, New Jersey

Specific, *Measurable* Student Behavioral Learning Objectives:
Upon completion of this course the student should be able to
1. Describe the difference among relational databases, semi-structured databases and object-oriented databases
2. Prepare a relational/object-relational schema from a conceptual model developed using the entity-relationship model
3. Demonstrate decomposition of a schema that maintains lossless-join and dependency-preservation properties
4. Implement relational or object-oriented databases that incorporate key, entity integrity, referential integrity constraints, indices, triggers, stored procedures, transaction management, concurrency control, and SQL/Host-language interface
5. Write complex queries to elicit information from a database

Detailed Outline of Course Content (Major Topics and Subtopics) **or Outline of Field Experience/Internship (experience, responsibilities and supervision)**

I.   Overview of databases
II.   Relational model and relational algebra
III. SQL
IV.   Constraints and triggers
      A. Keys and foreign keys
      B. Constraints on attributes and tuples
      C. Assertions and triggers
V.   Functional dependencies, multi-valued dependencies and normalization
VI.   Entity-Relationship model and ER-to-Relational mapping
VII. Object model and object-oriented databases
VIII. SQL in Server Environment
      A. The three-tier environment
      B. SQL/Host-language interface
      C. Stored procedure
IX.   Concurrency control and transaction management
X.   Introduction to query execution and query optimization
XI.   Semi-structured data model and its query language

Evaluation of Student Performance

The following as determined by the instructor

1. Assignments
2. Programming Projects
3. Oral Presentation
4. Research papers and/or Book Reports
5. Quizzes and Examinations
6. Final Examinations