Instructor: Dr. Manuel L. Penaloza  
Office: M-312  
Office hours: Mon. 1-2pm, Wed. 10-11am, Thu. 9-11am, Fri. 1-2pm, or by appointment.  
Office Phone: 605-394-6077  
Email: Manuel.Penaloza@sdsmt.edu  
Course Website: http://sdmines.sdsmt.edu/sdsmt/directory/courses/2009fa/csc484M001

Class Schedule  
MWF 2:00 – 2:50 pm [McLaury building, room 304]

Current Catalog Description  
(3-0) 3 credits. The study of formalized database design. This course will focus on relational model design and the use of SQL. Students will use a modern relational database to implement designs and learn the basics of data management.

Prerequisite  
Data Structures (CSC-300).

Textbook  

References  

Course Goals  
The purpose of this course is to provide fundamental concepts about database systems, conceptual design of databases independent of data model, the design process used in the relational database model, the use of database management systems (DBMS), and the emergence of new technologies that use databases systems. Database concepts addresses similar issues to other areas of computer sciences, such as, operating systems, data mining, artificial intelligence, parallel systems. The course covers in great detail, the relational model and relational DBMS. It introduces XML concepts and the interaction of the XML model with the relational model.

Topics  
Introduction to database systems  
The Entity-Relationship model  
The Relational model  
Database design and normalization  
Mapping data models  
Query languages
Microsoft SQL Server 2005
SQL, SQL scripts, stored procedures, triggers, ODBC, and JDBC
Data storage and indexing
Query evaluation and optimization
Transaction management
Concurrency Control
PHP scripting language
Dynamic web pages
Security and Integrity
XML model

Attendance Policy
Attendance is required for all class sessions. This course includes activities in addition to class lectures. You are responsible for the lecture material as well as the assigned readings in the textbook. Students are expected to attend and participate in all the activity sessions. If you must miss an activity session for some important reason, please send the instructor an email BEFORE the session is scheduled to start explaining the reason for your absence. 2% of your final grade will be deducted for every unexcused absence to an activity session.

Make-up Policy
The instructor will give you a make-up exam in case you have a legitimate reason for missing an exam, and ONLY if you have called the instructor or the Department office (605-394-2471) BEFORE the exam is scheduled to begin.

Course Objective
The main objective of this course is to provide students with an understanding of how data is maintained and accessed from a database system, by a user, a programmer, or from the WWW. The course will help students to recognize the importance of database systems in the implementation of software applications. Students will write a client-server application using VB or C#, and access a MySQL database from the Web using PHP.

Course Outcomes:
Upon completion of this course, students should, at a minimum, demonstrate the ability to:
1. Understand the impact of database management systems on organizations.
2. Know the purpose of the three-level database architecture and their mapping.
3. Understand the terminology of the relational model: relation, tuple, attribute, domain, cardinality, degree, views, and relational database.
4. Identify the candidate, primary, and foreign keys in a relational database.
5. Recognize the meaning and the enforcement of integrity constraints.
6. Use entity-relationship diagrams (ERDs) in database design, and the mapping from ERD into a relational database.
7. Write SQL queries, scripts, and stored procedures for manipulating and defining data.
8. Understand the effect of NULL values on conditions, aggregate functions, and grouping.
9. Understand the main stages of the database application lifecycle.
10. Create databases, populate them, and access and update the databases using Access and/or Microsoft SQL Server from Visual Basic .NET applications.
11. Identify anomalies and redundancies in relational databases.
12. Understand functional dependencies and the normalization process; and apply normalization rules to ill-designed database tables.
13. Understand the concept of a database transaction and its properties.
14. Recognize the purpose of concurrency control, database recovery, locks, and serializability.
15. Know the two-phase locking protocol and timestamp-based concurrency control.
16. Write a Web application using PHP and MySQL.

Grading Criteria
Grading will be based on students combined performance in homework assignments, student participation in class activities, 3 database projects, 2 tests and a final exam. The tentative schedule for these tests is test1: 10/07, test2: 11/16, and the final exam: 2:00-3:50 p.m. on Tuesday, December 15, 2009. This course is rather demanding and requires continuous and timely effort for success and good grade. You cannot simply plan on accumulating your study and computer projects to the last day.

Some of the homework will consist on writing SQL queries against an MS SQL Server database. The instructor will assign database accounts after the first week of classes. The weights given to each student work are:

- 2 midterm exams ................. 30%
- Final exam .......................... 20%
- Class activities ..................... 5%
- Assignments ....................... 15%
- 3 projects (10% each)............. 30%

The grading scale is:
- A : 90-up
- B : 80.00-89.99
- C : 70.00-79.99
- D : 60.00-69.99
- F : 0.00-59.99

Special Requirements
Students with special needs or requiring special accommodations should contact the instructor, and/or the campus ADA coordinator, Ms. Jolie McCoy, at 394-1924 at the earliest opportunity.

Electronic Device Policy
Please turn off your cell phone before class starts. No text messaging in class. No headphones. If you wish to use a laptop in this class for purposes of note taking, that’s great; however, you will be required to download DyKnow software and then join ENGL350 to activate. Any attempt to circumvent the DyKnow monitoring system will be considered a form of cheating and a breach of academic integrity. Note that according to “Policy Governing Academic Integrity” in the SDSM&T Undergraduate Catalog, the instructor of record for this course has discretion of how acts of academic dishonesty are penalized, subject to the appeal process, and that “Penalties may range from requiring the student to repeat the work in question to failure in the course” (72-73). No other use of any other electronic/computer media is allowed during class time.

Freedom in Learning Statement
Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious
consideration of student opinions or conduct unrelated to academic standards should contact the dean of the college which offers the class to initiate a review of the evaluation.

**NOTES and POLICIES:**

1) If you are having troubles with an assignment come see the instructor immediately. The instructor is aware there is not enough time in the classroom for everyone.

2) All work must be handed in at the beginning of class on the due date. The instructor will not accept any work of a student who is not present in class.

3) Late assignments are not accepted. Any type of assignment not turned in or exams not taken count as ZEROS. There are NO MAKEUP assignments or programming projects.

4) Some course material, such as assignments, solutions will be published at the course’s web site.

5) The work to be handed in for this class must be an individual effort unless the instructor has explicitly stated otherwise. The instructor expects every student to produce his/her own solution and work. Coping someone else’s code or work is not acceptable. The minimum penalty for any violation to this policy will be a zero to the assignment, project, or exam and one lower final letter grade.

6) Each completed project should be well documented. The assignment sheet will indicate what is expected for documentation.

7) The school has computer, software, network, and academic conduct guidelines and policies. Please make sure you are well familiar with them and follow them.