Instructor Name: Chris Golubski

Course Name: Introduction to SQL and Relational Database Design

Course Description: This course will teach interested parties the basics of relational database design and Structured Query Language (SQL). Students will have the opportunity to design their own database, as well as learn how to input and extract data using SQL. The course will focus on best practices of relational database design as well as a broad overview of the different types of queries used to retrieve data from a relational database. Technology used will include Microsoft Access and Microsoft SQL Server; however, the material taught in this course can be applied to many different technology platforms.

Day 1:
   I. Introduction to Database Design
      a. Structure of Relational Databases
      b. Creating Tables
      c. Data Types
      d. Primary Keys
      e. Indexing
      f. Setting Up Relations Between Two Tables
         i. Foreign Keys
         ii. Implementing Relationships
            1. One To One
            2. One To Many
            3. Many To Many

Day 2:
   II. Advanced Database Design
      a. Normal Forms
         i. First
         ii. Second
         iii. Third
         iv. Higher (academic discussion only)
      b. Design Optimization
         i. Denormalization

   III. Introduction to SQL
      a. SELECT statements
         i. WHERE clauses
         ii. ORDER BY keyword
b. INSERT statements  
c. UPDATE statements  
d. DELETE statements

Day 3:  
IV. Intermediate SQL  
a. Advanced SELECT statements  
   i. Joins  
      1. INNER JOIN  
      2. OUTER JOIN  
      3. UNION  
b. SQL Functions  
   i. Aggregate Functions  
   ii. Scalar Functions  
   iii. Date Functions

Day 4:  
V. Advanced SQL  
a. Creating Database Structures  
   i. CREATE DATABASE  
   ii. CREATE TABLE  
   iii. CREATE INDEX  
b. Modifying and Deleting Database Structures  
   i. ALTER statements  
   ii. DROP statements  
c. Creating and Managing Database Views  
d. Introduction to Stored Procedures  
e. Table Triggers  
VI. Best Practices  
a. Optimization  
b. Design Cautions  
c. Vulnerabilities  
VII. Conclusions and Wrapping Things Up