**CIT 111 Course Objectives**

1. Understand how databases are used in business
2. Learn and apply the data modeling terms: table, row, column, constraint, primary key, foreign key, inner join
3. Install a database management system (DBMS)
4. Use a computer aided software engineering (CASE) tool to create a database
5. Use a CASE tool to create and drop tables
6. Use a CASE tool to insert, update, and delete rows

Use a CASE tool to query a database

1. Understand how databases are used in dynamic web pages

**CIT 111 Detailed Course Objectives**

1. Understand how databases are used in business and the benefits
2. SQL: Learn how to write simple and complex database queries
   1. Simple Queries
      1. Clauses: SELECT, FROM, WHERE, ORDER BY
      2. Operators: AND, OR, NOT, IN, BETWEEN, LIKE, IS NULL
   2. Queries with Joins
      1. Joins: CROSS, INNER, OUTER
   3. Queries with Aggregates
      1. Functions: SUM, COUNT, AVG, MIN, MAX
      2. Clauses: GROUP BY, HAVING
3. SQL: Learn how to write insert, update, and delete statements
   1. Learn how to write a re-runnable insert script
4. SQL: Learn basic data types and functions
   1. CHAR, VARCHAR, INT, DECIMAL, DATE, TIME, DATETIME, BLOB
   2. CAST, CONVERT, FORMAT
   3. CONCAT, TRIM, LENGTH, LEFT, RIGHT, SUBSTRING, REPLACE, UPPER, LOWER
   4. ROUND, TRUNCATE, CEILING, FLOOR, ABS, SIGN, SQRT, POWER, RAND
   5. SYSDATE, CURDATE, MONTH, YEAR, EXTRACT, DATE\_ADD, DATEDIFF
5. Learn how to write a Statement of Work (SOW) and business requirements
   1. SOW: History, Scope, Constraints, Objectives, Tasks and Timeline
   2. Gather Info: Business Docs, Interviews, Surveys, Job Shadow
      1. Forms vs. Reports
      2. Open-Ended vs. Closed-Ended Questions
   3. Database Requirements: Data, Report, Security
6. Learn fundamental data modeling principles and design best practices
   1. Logical Design – Entity Relationship Diagram (ERD)
      1. Entity
      2. Attribute
      3. Relationship
         1. One to One
         2. One to Many
         3. Many to Many
   2. Physical Design
      1. RDBMS Selection
      2. Data Types Selection
      3. Data File Location and Settings
   3. Synonyms
      1. Entity – Table – Relation
      2. Attribute – Column/Field – Attribute
      3. Instance – Row/Record – Tuple
      4. Linking – Association – Bridge – Many to Many
   4. Design Best Practices
      1. Use surrogate key as the primary key for entities
      2. Every entity should have a unique index built on it’s natural key
      3. Every entity should have a unique index built on it’s surrogate + natural key attributes combined.
      4. Linking tables should have their own surrogate key