

## ITMD 321 SYLLABUS

### ITMD 321 Data Modeling and Applications

Hours: 3 credit hours / 45 contact hours

Instructor: Peter Fales

#### Textbook, title, author, and year:

*Learning SQL: Mastering SQL Fundamentals, 2nd Edition*, Alan Beaulieu, 2009.

*Creating your MySQL Database: Practical Design Tips and Techniques*, Marc Delisle, 2016.

#### Specific course information:

- a. **Catalog description:** Basic data modeling concepts are introduced. Hands-on database design, implementation, and administration of single-user and shared multi-user database applications using a contemporary relational database management system.
- b. **Prerequisites:** None
- c. **Required.**

#### Specific goals for the course

- a. **Program Education Objective:**
  1. Problem solve and create innovative answers to provide technology solutions for the problems of business, industry, government, non-profit organizations, and individuals.
- b. **Course Outcomes:**  
At the conclusion of this course, each successful student will be able to:
  - Describe the theoretical and physical concepts of a relational database.
  - Employ design methodology for databases and verify their structural correctness.
  - Use query languages, primarily SQL, and database management software.
  - Design and build a simple database management system and perform fundamental tasks involved with modeling, designing, and implementing a DBMS.
  - Demonstrate knowledge of essential DBMS concepts: database security, high availability, backup and recovery and SQL database tuning.
- c. **Course student outcomes:**  
At the conclusion of this course, each successful student will be able to:
  - Describe the theoretical and physical concepts of a relational database.
  - Explain the design methodology for databases and verify their structural correctness.
  - Use query language, primarily SQL, and their database related supported software.
  - Implement the theory behind the various database models and query languages.

- Design and build a simple database management system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
- Outline essential DBMS concepts: database security, high availability, backup and recovery and SQL database tuning
- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions (**ABET Computing Criterion 3.1**)
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline (**ABET Computing Criterion 3.2**)
- Identify and analyze user needs and take them into account in the selection, creation, evaluation, and administration of computer-based systems (**ABET IT Criterion 3.6**)

#### Topics to be covered

- a. Introduction to databases DBMS Concepts
- b. Introduction to Virtualization
- c. Relational Model ER – Modeling Intro to SQL
- d. Database Design More SQL Intro
- e. Data Definition Language Data Types and Constraints Normalization
- f. Schema Definition Table Creation SQL Queries
- g. SQL Intro
- h. MySQL Workbench Introduction Filtering (WHERE clause)
- i. MySQL Workbench MySQL for Excel
- j. Joins
- k. Sets
- l. Case Studies MySQL Server
- m. Server Administration
- n. Subqueries Grouping and Aggregates
- o. Advanced Joins
- p. Conditional Logic
- q. Transactions
- r. Indexes Constraints
- s. Views Metadata
- t. Programming/APIs SQLite
- u. Database auditing and Security
- v. Database Backup and Disaster Recovery
- w. Introduction to NoSQL databases Big Data
- x. Deeper dive into DDL, DCL, TCL
- y. Deeper dive into Cassandra and CQL