## COURSE DESCRIPTION

Students are taught the systematic process of database design and implementation using fundamental concepts of business data models, translating these models to a relational database, normalization of tables, database relationships, and simple Structured Query Language (SQL) queries, in a SQL professional server environment.

### SPECIFIC OBJECTIVES

Upon successful completion of this course, students will be able to

1. develop a data model from a real-world business situation;
2. translate this model into its relational database equivalent;
3. normalize tables and implement proper relationships;
4. query and update databases; and
5. utilise SQL professional server.

## COURSE CONTENT

### I. Databases

#### A. Concepts
- Table
- Rows
- Columns

#### B. Types
- Relational
- Object-oriented file

#### C. Roles

#### D. Advantages and Disadvantages
- Structural
- Data dependence
- Data redundancy

### II. Data Models Design Concepts

#### A. Map identified business rules

#### B. Types
- Hierarchical
- Object-oriented
Title: Database Fundamentals
Abbreviation and Number: CISB307

iii. Relational

C. Degrees of data abstraction

III. Entity-Relationship Model And Object-Oriented Model
   A. Components
      i. Entities
      ii. Attributes
      iii. Relationships
      iv. Development

IV. Advanced Data Modeling
   A. Entity
      i. Super types
      ii. Sub types
   B. Aggregation
   C. Specialization hierarchies
   D. Inheritance
   E. Primary key guidelines
   F. Composite keys
   G. Surrogate keys

V. Normalisation
   A. Concept
   B. Normal form stages
      i. First
      ii. Second
      iii. Third
      iv. Fourth
   C. Denormalised database

VI. Relationships
   A. One-to-one
   B. One-to-many
   C. Many-to-many

VII. Keys
   A. Primary
   B. Foreign
   C. Composite

VIII. SQL Professional Server Interface
   A. Enterprise Manager
   B. Analyser
   C. Tools
   D. Functionalities
      i. Table
ii. Field creation
iii. Alteration
iv. Deletion
v. Analysis of queries

IX. Select And Update Queries
   A. Simple joins
   B. Conditional restrictions
   C. Arithmetic and logical operators
   D. Rules of precedence

X. Insert And Delete Queries
   A. Insert-by-value
   B. Insert-by-select
   C. Conditional restrictions
   D. Referential integrity constraints

XI. Programme Interface
   A. Database connectivity to applications
      i. Native SQL connectivity
      ii. ODBC
      iii. DAO
      iv. RDO
      v. OLE-DB
      vi. ADO .NET
      vii. Java Database Connectivity.

XII. Different SQL Dialects
   A. Oracle
   B. MySQL
   C. T-SQL
   D. Syntactical differences

ASSESSMENT
Assignments 30%
Tests 30%
Project 20%
Final Examination 20%
Total 100%

REQUIRED TEXT
SUPPLEMENTARY READINGS/MATERIALS

JOURNALS
ACM Transactions on database systems, Association of Computing Machinery
ACM Transactions on Information and System Security
IEEE Transactions on Knowledge and Data Engineering
Journal of Computer Security, Data & Knowledge Engineering
Journal of Database Management (JDM), IGI Publishing, Hershey, PA, USA
Parallel and Distributed Database Journal

WEBSITES
http://camosun.ca/learn/calendar/current/web/comp.html. (Camosun College, COMP 155 Database Concepts)
http://math.hws.edu/dept/cs_courses.html. (Hobart and William Smith College 343 Database Theory and Practice)