Course number and name: 230CIS-3 Fundamentals of Databases

Credits and contact hours: 3 crs.; 5hrs (2hrs theory, 2 hrs. Lab and 1 hr. Tutorial)

Instructor's Name: Dr. Ahmad Taleb

Text book, Title, Author, and Year: Fundamentals of Database Systems, 6th (or 5th, 4th, 3rd) edition, Elmasri & Navathe, Addison-Wesley, 2007. ISBN: 0-321-36957-2

a. **Supplemental Materials:** <Database System Concepts> Silberschatz, Korth, Sydarshan. McGraw-Hill. Either 5th edition 2005 or 4th edition, 2002. ISBN 0-07-295886.

Specific Course Information

d. **Catalog Description:** Study of fundamental concepts and techniques of modeling and design of databases and database programming languages. We begin with an introduction to Databases, architecture of Database Management Systems (DBMS), overview of database design and SQL programming language. Database design models and notations: the entity relationship (E/R) and brief overview of Object Oriented Data Model. Relational database theories, including the conversion of E/R to normalized relational databases, functional dependencies and normalization. Relational Algebra. Advanced SQL covers sub-queries and views, triggers integrity constraints.

e. **Pre-requisites or Co-requisites:** None

f. **Required, Elective, or Selected elective:** Required

Specific Goals for the Course

b. **Specific Outcomes of the Instruction:**

- Explain the general concepts and characteristics of database, database system, data, DBMS, database design, database programming languages
- Design Entity Relationship Model (E/R) for a realistic application
- Create a normalized, well-structured relational data model by using database theories such as the conversion from E/R to set of relational tables and functional dependencies, canonical covers, decomposition and normalization techniques
- Solve simple queries by using the operations (selection, projection, join, Cartesian product) of the theoretical database language Relational Algebra
- Manage the relational database schemas through the DDL SQL statements (Create, Drop, Alter) with either the MySQL or Oracle database server
- Implement simple and complex SQL statements to specify or modify the relation/database instances.
- Solve effectively in teams the course project goal within time and resource constraints
- Practice communication skills in writing and presenting the course project.

c. **Students Outcomes Addressed by the Course:** a, b, c, d, f, i, j

Brief List of Topics to be Covered

- Introduction to Databases and DBMS
- Introduction to SQL
- Entity / Relationship
- Model (E/R(
- Relational Data Model
- Functional Dependencies
- Canonical covers and decomposition
- Normalization
- Relational Algebra
- Advanced SQL