**COEN 4810 Database Applications**

**Credits and contact hours:** 3 credit course, meeting for 3 50-minute periods each week.

**Course coordinator:** Dr. Ed Yaz

**Text:** Elmasri and Navathe, Fundamentals of Database Systems, 5th edition, Addison Wesley, 2007.

**Catalog description:** Presents the design and application of databases. Topics include: models for databases, database query languages, database design methods, methods for storing and retrieving information from a database, database optimizations, transaction processing, and a brief examination of some advanced concepts, including object databases, distributed databases and database security.

**Prerequisites:** COSC 2100 Data Structures and Algorithms orCOSC 2010 Data Structures for Engineers or equivalent experience.

**Selected Elective** in ELEN Computer Hardware & Software area,COEN Software area (depth only)

**Professional component:**

Engineering science – 50%

Engineering design – 50%

**Course Goals:**

* Introduce entity-relationship models for databases.
* Present the relational data model for databases.
* Describe SQL, a database query language.
* Provide practical database design methods that use UML.
* Describe the physical and logical methods for storing and retrieving data from a database.
* Present optimized techniques for processing database queries.
* Introduce fundamental concepts for transaction processing.
* Present an overview of advanced database concepts including object databases, security issues, and distributed databases.

**Specific outcomes of instruction***By the end of this course, you should....*

1. Be able to model data using the entity-relationship model.
2. Be able to model data using a relational model.
3. Be able to manipulate relational data using relational algebra and calculus.
4. Be able to use the basic SQL constructs.
5. Be able to identify functional dependencies in relational databases.
6. Be able to use several database design algorithms.
7. Be able to design a database using UML.
8. Be able to explain the relationships among disk organization, file structures, and hashing.
9. Know several indexing structures for files and be able to use them.
10. Know several algorithms for processing queries and be able to use them.
11. Understand how to tune a database.
12. Understand the basic concepts behind transaction processing.

**Student outcomes addressed by the course:**Partial fulfillment of Criterion 3 objectives A, E, G, H, I, J, and K

**Brief list of topics to be covered**

Overview of Database Systems (Chapters 1 and 2)

Entity-Relationship Models (Chapters 3 and 4)

Relational Model and Database Design (Chapters 5 – 7)

Structured Query Language (SQL, Chapters 8 and 9)

Database Design (Chapters 10 – 12)

Data Storage and Query Processing (Chapters 13 – 15)

Advanced Topics (Student Presentations)

Last modified: January 24, 2017