**ABET Course Syllabus – CS4222**

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| **Code** | CS4222 | **Credits** | 3 |
| **Title** | Principles of Database Systems | **Coordinator** | Huiping Guo |

**Course Information**

1. **Catalog Description:** Database system architecture; disk and file management; buffer management; record file structures; database catalog; concurrency control; failure recovery; query processing; indexes; query optimization.
2. **Prerequisites**: CS 1222, and 3112
3. **Contact Hours**: 3 hours/week
4. **Required/Elective:** This course an elective in the BS program.

**Textbook**

Ramez Elmasri and Shamkant Navathe. *Fundamentals of Database Systems(7th edition)*, Addison Wesley

**Course Goals**

The Student Learning Outcomes that are addressed by the course are:

* SLO1. Students will be able to apply concepts and techniques from computing and mathematics to both theoretical and practical problems.
* SLO3. Students will have a strong foundation in the design, analysis, and application of many types of algorithms.
* SLO4. Students will have a fundamental understanding of computer systems.

Other outcomes of instruction:

At the end of the course, students are able to

* Understand Entity-Relationship (ER), relational, and object-oriented data models.
* Be proficient in query languages including relational algebra, relational calculus, and SQL.
* Design and implement complex databases schemas using ER diagrams, normalization, integrity constraints, and advanced database system features such as stored procedures and triggers.
* Understand the internals of a database management system including disk access, buffer management, failure recovery, concurrency control, query execution, and indexes.
* Improve database performance using hardware, software, and query tuning techniques.

**Topics Covered**

* Introduction to database system architecture
* Entity-Relationship model and ER diagram
* Relational data model
* Mapping
* Relational algebra and relational calculus
* Structured Query Language (SQL)
* PL/PgSQL
* Functional dependency
* Normalization
* Multivalued dependency
* Stored procedures
* Triggers
* Database application development