Course Outline

1. Document Information

Degree Program	Computer Science
Course Number	CS 430
Course Title	Database Systems
Semester Hours	3
Course Coordinator	Dunren Che
Revision Term	Spring 2020
Latest Revision	Fall 2020

2. Catalog Description

The course concentrates on the relational model, database design, and database programming. Topics include relational model, relational algebra, SQL, constraints and integrity, transaction support, concurrency control, database design, normalization, backup, recovery, and security. A comprehensive product-like project is an integral part of the course.

3. Textbooks

- Ullman, J. D., & Widom, J. (2008). A First Course in Database Systems. Prentice-Hall, 3rd Edition. ISBN:9780136006374

4. References

5. Course Learning Outcomes

- To learn the principles and the core technologies of modern DBMS.
- To obtain a solid understanding on all the major aspects of a DBMS.
- To learn to develop professional database applications.

6. Assessment of the Contribution to Student Outcomes

Outcome	1	2	3	4	5	6
Assessed	X	X				X

7. Prerequisites by Topic

CS 330 with a grade of C or better or graduate standing.

8. Major Topics Covered in the Course

1. Background: basic database concepts, examples Relational model Network and hierarchical models {3 classes}
2. Microsoft access review: creating tables, entering data, updates, queries, reports, forms {2 classes}
3. Database design methodology: goals, user views, methodology, examples, entity-relationship model {5 classes}
4. SQL : data definition (DLL), simple queries, functions, joins, nesting, grouping, updates, views, privileges, indexes, modifying table structure, catalog {5 classes}
5. Relational algebra: conventional set operations, select, project, join, and divide {4 classes}
6. Relational calculus: tuple relational calculus and domain relational calculus {4 classes}
7. Oracle: creating and filling tables, queries, SQL, reports, forms and SQL Plus {2 classes}
8. Application development: embedded database access and API-based approach (ODBC and JDBC) {5 classes}
9. Schema refinement and normalization: functional dependence analysis, anomalies, 1st, 2nd, 3rd, and BCNF {5 classes}
10. Components of a DBMS: data storage and retrieval, catalog, transactions, concurrency control, recovery, security, communications, integrity {3 classes}
11. Selected additional topics: XML data model and XQuery, etc {2 classes}