The course concentrates on the relational model and includes several query languages. Topics covered include normalization, database design, catalogs, transaction support, concurrency control, integrity support, backup and recovery, and security. Projects involve the use of both personal and enterprise database systems.

Textbooks


References

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.

Assessment of the Contribution to Student Outcomes

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Prerequisites by Topic

CS 330 with a grade of C or better.
## 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 (DDL), 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}

Latest Revision: Spring 2017