

Database Systems

2023-2024 Catalog

[ARCHIVED CATALOG]

CSCI 210 - Database Systems

PREREQUISITES/COREQUISITE: [CSCI 105 - Discrete Logic for Computers](#).

PROGRAM: Computer Science

CREDIT HOURS MIN: 3

TOTAL CONTACT HOURS MIN: 3

DATE OF LAST REVISION: Fall 2020

The course presents the theory and practice of database systems and gives an advanced introduction into the concepts for modeling, designing, querying, and managing large and distributed databases. The emphasis will be on theoretical considerations involved in modeling data and the principles of database systems in a multi-user environment. Students will address issues associated with enterprise database processing with respect to user authentication and development in an application/internet environment.

MAJOR COURSE LEARNING OBJECTIVES: Upon successful completion of the course, the student will be expected to:



1. Differentiate the use of a database from the approach of programming with data files
2. Explain the concept of data independence and its importance in a database system.
3. Differentiate between object-oriented, relational and other database models (structured and unstructured).
4. Select, develop and evaluate the appropriate enterprise database architecture based on the requirements of an organization.
5. Identify data integrity and security requirements including access control, least privilege, and database/data encryption.
6. Demonstrate an understanding of user needs assessment for existing and future information needs
7. Apply normalization techniques (e.g. E. F. Codd).
8. Develop a logical/conceptual data model, including all entities, relationships, and attributes from business rules and requirements.
9. Derive a physical design from the logical design in view of application, hardware, operating system, and network requirements.
10. Implement user authentication, privileges and roles for major DBMSs.
11. Process a database via SQL and application programs.
12. Develop programs that interface with a database, implementing the insertion, retrieval, and updating of data.
13. Assess data mining, data warehouse, and OLAP cube concepts in support of all management levels.
14. Describe the advantages and disadvantages of central organizational control over data
15. Explore distributed database design methods, heuristics, and design tradeoffs.
16. Examine issues related to query execution, including optimization, transaction management, and fault tolerance.
17. Investigate vulnerabilities and failure scenarios in database systems.
18. Discuss ethical and privacy issues associated with database systems

COURSE CONTENT: Topical areas of study include -

- Business intelligence, data warehousing and mining

- Entity Relationship (ER) Modeling
- Data Integrity
- Knowledge management
- Database administration
- Object-oriented database
- Database backup and recovery
- OLAP Cube and database processing principles
- Database connectivity
- Performance measurement techniques
- Database design and normalization
- Performance tuning and query optimization
- Database Security
- Structured query language (SQL)
- Database systems and data models
- Structured/Unstructured Data
- Distributed database & multi-user management systems
- Transaction management and concurrency control
- DML/DDI/DCL
- XML/JSON Schema

[Course Addendum - Syllabus \(Click to expand\)](#)

