

COURSE DESCRIPTION

Dept., Number	CS425	Course Title	Database Organization
Semester hours	3	Course Coordinator	Dr. Nazli Goharian, Clinical Associate Professor

Current Catalog Description

Overview of database architectures, including the Relational, Hierarchical, Network, and Object Models. Database interfaces, including the SQL query language. Database design using the Entity-Relationship Model. Issues such as security, integrity, and query optimization. Prerequisite: CS 331 or CS 401 or CS 403. (3-0-3) (T) (C)

Textbook

Silberschatz, H.F. Korth, and S. Sudarshan, Database System Concepts, McGraw-Hill, ISBN 0-07-295886-3, 2005

OR

R. Ramakrishnan and J. Gehrke, Database Management Systems, McGraw-Hill, ISBN 0-07-246563-8 0072283637, 2002

References

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Course Outcomes

Students should be able to:

- Design and model a design scenario using relational data modeling, which includes:
 - Analyze the design anomalies.
 - Construct Entity Relationship Diagram.
 - Analyze and Construct Functional Dependencies for the business rules.
 - Analyze Functional Dependencies to identify Primary keys.
 - Analyze and Perform Normalization and Normal Forms.
 - Define referential integrities.
 - Create relational database design schemas in 3-NF/BCNF for a design scenario of the size of ca. 8-10 tables.
- Solve abstract relational language, such as relational algebra problems.
- Solve database transactions by using Structured Query Language (SQL), used by RDBMSs.
- Explain the general concept of the additional topics such as: Query Optimizations,

Concurrency Control, Recovery, structured data and text, and data warehousing.

- Implement a relational database application, using a commercial/ open source RDBMS (Such as Oracle or mysql). This includes both the design and the implementation of an application that uses a relational database management system for the storage of the data and provides a user interface for the insertion, deletion, update and query of the data in this database by a user.

Relationship between Course Outcomes and Program Outcomes

The following Program Outcomes are supported by the above Course Outcomes:

- a. An ability to apply knowledge of computing and mathematics appropriate to the discipline
- c. An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs
- d. An ability to function effectively on teams to accomplish a common goal
- f. An ability to communicate effectively with a range of audiences
- i. An ability to use current techniques, skills, and tools necessary for computing practices.
- j. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices
- k. An ability to apply design and development principles in the construction of software systems of varying complexity

Prerequisites by Topic

Data Structures, Algorithm and Strong Object Oriented Programming.

Major Topics Covered in the Course

1. Introduction	1.5 hours
2. Relational Model	4.5 hours
3. Relational Algebra	4.5 hours
4. SQL	4.5 hours
5. Database Design	4.5 hours
6. Query Optimization	4.5 hours
7. Recovery and Concurrency Control	4.5 hours
8. Integration of Structured Data and Text	4.5 hours
9. Special Topics: Data Warehousing, Data Mining	4.5 hours
10. Midterm and review	3 hours
Final Exam	-
	45 hours

Assessment Plan for the Course

End of every semester Course Objective Assessments by CS department. End of semester Course Evaluations by IIT. Reviewed every Spring semester by CS Undergraduate Studies Committee for possible updates in the following Fall. Once every 4-5 years a detailed review of all materials for the course is made by the CS Undergraduate Studies Committee.

How Data in the Course is Used to Assess Program Outcomes (unless adequately covered already in the assessment discussion under Criterion 4)

See the assessment discussion under Criterion 4

For a computer science program

Estimate Curriculum Category Content (Semester hours)

Area	Core	Advanced	Area	Core	Advanced
Algorithms		1	Software design		1
Data structures		1	Concepts of programming languages		