

# IT-2352: DATABASE SYSTEMS

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## Cuyahoga Community College

### Viewing: IT-2352 : Database Systems

**Board of Trustees:**

May 2025

**Academic Term:**

Fall 2026

**Subject Code**

IT - Information Technology

**Course Number:**

2352

**Title:**

Database Systems

**Catalog Description:**

Design, develop, and normalize databases using Structured Query Language (SQL) to third normal form. Create diagrams and implement database objects to support relational design. Retrieve, insert, update, delete, troubleshoot, and report data from SQL databases for effective data management and analysis.

**Credit Hour(s):**

3

**Lecture Hour(s):**

2

**Lab Hour(s):**

2

## Requisites

**Prerequisite and Corequisite**

IT-1026 Introduction to Computing; IT-1051 Introduction to Programming; and MATH-0955 Beginning Algebra, or qualified Math placement.

## Outcomes

**Course Outcome(s):**

Apply knowledge of data migration, data warehousing, data mining, distributed databases, and security to design, develop and normalize a SQL database to third normal form using appropriate diagrams and database objects.

**Essential Learning Outcome Mapping:**

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

**Objective(s):**

1. Describe the relational approach to databases using diagrams to show various join types and their outcomes.
2. Articulate and present a database model including business rules, implementation of business rules in database design, the normalization process (including appropriate diagrams), complex data inquiries, database maintenance and migration issues.
3. Prepare dependency diagrams that properly represent the break down of dependencies through the normalization process in a complex database (five or more tables).
4. Normalize a databases with at least five tables through third normal form and explain normalization through fifth normal form while adhering to the defined business rules.
5. Display an understanding of the various types of dependencies: full, partial and transitive through implementation of a database project.
6. Create database objects using SQL that represent pre-defined business rules and a detailed normalization process.
7. Design and formulate constraints derived from business rules which have been implemented in entity relationship diagrams.
8. Explain the difference between constraints and triggers in the creation and implementation of a complex database.

9. Analyze database selection, implementation, administration, and security processes for distributed databases.
10. Explain the process of data migration in relationship to data warehousing, data mining and necessary security measures.

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**Course Outcome(s):**

Retrieve, insert, update, delete, troubleshoot and report data from complex SQL databases.

**Objective(s):**

1. Retrieve, insert, update, and delete data using Data Definition Language, Data Retrieval Language and Data Manipulation Language statements as a part of the creation of a complex database (five or more tables) that adheres to business rules.
2. Implement functions in SQL statements to represent data as defined by business rules and ad hoc situations.
3. Use commands to explore data dictionaries to troubleshoot complex databases.
4. Assimilate data using grouping statements in response to business inquiries.
5. Implement Join and Set Operations to prepare normalized data for reporting.
6. Properly implement joins including equi-joins, outer-joins and self-joins in a complex database to represent data from multiple tables or, copies of the same table.
7. Produce subqueries to represent multifaceted database outcomes.

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**Methods of Evaluation:**

1. Hands-on Lab Exercises
2. Quizzes
3. Exams
4. Class Participation
5. Semester Project

**Course Content Outline:**

1. Concepts
  - a. Dependencies
  - b. Normalization
  - c. Third normal form
  - d. Fifth normal form
  - e. Business rules
  - f. Database objects
  - g. Constraints
  - h. Triggers
  - i. Functions
  - j. Data dictionary
  - k. Relational database
  - l. Tables
  - m. Data redundancy
  - n. Data integrity
  - o. Distributed database
  - p. Data migration
  - q. Data warehousing
  - r. Data mining
  - s. Security
  - t. Database modeling
  - u. Database design
  - v. Database maintenance
  - w. Database selection
  - x. Database administration
  - y. Datatypes
  - z. Query
  - aa. Nested queries
  - bb. Data manipulation

- cc. Data control
- dd. SQL commands
- ee. Programming concepts
- 2. Skills
  - a. Prepare dependency diagrams
  - b. Create entity relationship diagrams
  - c. Normalize a database to third normal form
  - d. Retrieve, insert, update, delete, and report data
  - e. Troubleshoot complex database
  - f. Create and revise SQL objects
- 3. Issues
  - a. Constraints
  - b. Data integrity
  - c. Data redundancy
  - d. Security
  - e. Migration

### Religious Accommodation

Before reviewing the course schedule, students should carefully review the following religious accommodation policy and other required instructional policies:

#### Religious Accommodation:

Students seeking an accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor with written notice of the specific dates for which the student requires an accommodation and must do so not later than fourteen (14) days after the first day of instruction. Please submit requests for accommodations at this link: <https://portal2.tri-c.edu/ReligiousAccommodation/ReligiousAccommodationForm>. Students with questions about their religious accommodations under Ohio's Testing Your Faith Act may contact the College's Office of General Counsel and Legal Services by phone at 216.987.4856 or via email at [legal@tri-c.edu](mailto:legal@tri-c.edu).

#### Other Required Instructional Policies:

<https://www.tri-c.edu/student-resources/curriculum/documents/syllabus-part-b.pdf>

### Weekly Schedule

	Topics
Week 1	Installing Software and Intro to SELECT statements
Week 2	Practice with SELECT statements
Week 3	JOINS IF statements, handling NULL values, handling dates
Week 4	JOINS IF statements, handling NULL values, handling dates
Week 5	Summary Queries and Grouping
Week 6	Unions and Subqueries
Week 7	Miscellaneous Functions and CASE statements Parts of SQL as a Language
Week 8	Data Manipulation Language (DML) Primary Keys, Foreign Keys, Referential Integrity, Data Types, and Constraints
Week 9	Intro to Data Definition Language (DDL) Normalization and Indexes
Week 10	DDL Continued, the Forward Engineering Tool
Week 11	Views and Getting Started with Procedures
Week 12	Procedures and Functions
Week 13	Events and Triggers
Week 14	Users, Roles, and Privileges
Week 15	Transactions, Commit, and Rollback
Week 16	Final Project

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

### **Required/Recommended Readings**

*Murach's MySQL*, Joel Murach

### **Resources for the Instructor**

Murach, Joel. *Murach's MySQL*. 4th ed. Fresno, CA: Mike Murach & Associates, Inc., 2023.

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Shields, Walter. *SQL Quick Start Guide*. Albany, NY: ClydeBank Media LLC, 2019.

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Coronel, Carlos and Steve Morris. *Database Systems: Design, Implementation & Management*. 14th ed. Boston, MA: Course Technology, 2022.

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Kroenke, David. *Database Processing: Fundamentals, Design and Implementation*. 16th ed. Upper Saddle River, NJ: Pearson Education, Inc., 2023.

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Shellman, Mark, Hassan Afyouni, Philip J. Pratt, and Mary Z. Last. *A Guide to SQL*. 10th ed. Detroit: South-Western, Cengage Learning, 2021.

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### **Additional Resources for the Instructor**

1. w3schools.com: <https://www.w3schools.com/sql/default.asp>. 2025.
2. <https://www.sqltutorial.org/>. 2009.
3. <https://www.geeksforgeeks.org/sql-tutorial/>. 2025.
4. Database normalization: <https://www.guru99.com/database-normalization.html>. 2025.

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