

Montgomery County Community College  
 CIS 245  
 Database Management Systems Using SQL  
 3-2-2

**COURSE DESCRIPTION:**

This course is designed to introduce the student to the concepts involved in designing and using a database management system. Topics to be considered in the course will include discussions of various types of database structures, manipulations of a database structure through applications, query techniques, and an investigation into a database language.

**REQUISITES:***Previous Course Requirements*

- CIS 111 Computer Science I: Programming and Concepts or CIS 1101 Introduction to Problem Solving and Programming

*Concurrent Course Requirements*

None

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Explain the basic concepts involved in designing and using a database management system.	Lecture Discussion Hands-On Lab Exercises Homework Assignments Group Projects	Hands-On Lab Exercises Quizzes Exams
2. Explain the key concepts of modern relational database design including relationships, logical and physical organizations, schema and subschema and data normalization.	Lecture Discussion Hands-On Lab Exercises Homework Assignments Group Projects	Hands-On Lab Exercises Quizzes Exams
3. Demonstrate the appropriate design techniques for constructing database queries.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
4. Demonstrate the use of query facilities including data structures for establishing relations, query functions, and design and translation strategies.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Projects
5. Explain the importance of index organization including relation to files and design strategies.	Lecture Discussion Hands-On Lab Exercises Homework Assignments Group Projects	Hands-On Lab Exercises Quizzes and Exams
6. Explain the basics of database file security including authentication, authorization, transformation, and encryption.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Hands-On Lab Exercises Quizzes and Exams
7. Construct databases that utilize proper file organization techniques including storage hierarchies, data structures, multiple key systems, and indexed files.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Final Projects
8. Construct databases that promote data integrity and reliability.	Lecture Discussion Hands-On Lab Exercises Homework Assignments	Final Projects

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria.*

#### SEQUENCE OF TOPICS:

1. Discuss Basic Components of a Relational Database System (RDBMS)
2. Explain the Basic Concepts of the Structured Query Language (SQL)
3. Discuss the Concepts of Good Data Modeling
4. Construct Simple Database Queries
5. Discuss the First Three Levels of Data Normalization
6. Demonstrate the Construction of Single and Multi-Table Joins
7. Explain the Importance of Data Requirements Definition to the Database Design Process

8. Demonstrate Mastery of These SQL Techniques:
  - a. Subqueries
  - b. Aggregate Functions
  - c. Dynamic Embedded SQL
  - d. SQL Access Paths
  - e. SQL APIs
  - f. SQL Futures
9. Explain the Proper Concepts of Relational Database Design
10. Explain the Importance of Database Concurrency and Referential Integrity
11. Discuss Appropriate Recovery Strategies for Data
12. Demonstrate an Understanding of the Key Principles of Relational Algebra
13. Discuss Appropriate Techniques to Achieve Database Security

#### LEARNING MATERIALS:

Ricardo, (2012). *Databases Illuminated*, 2<sup>nd</sup> ed, 9781449606008

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

#### COURSE APPROVAL:

Prepared by: Marie Hartlein	Date: 1/1995
Revised by: Marie Hartlein	Date: 1/1997
Revised by: Alan Evans	Date: 4/2006
Revised by: Kathleen Kelly	Date: 7/14//2012
VPAA/Provost or designee Compliance Verification: Victoria Bastecki-Perez, Ed.D.	Date: 9/10/2013
Revised by: Anil Datta	Date: 11/13/2015
VPAA/Provost or designee Compliance Verification: Victoria Bastecki-Perez, Ed.D.	Date: 11/13/2015
Revised by: Kathleen Kelly	Date: 2/20/2016
VPAA/Provost or designee Compliance Verification: Victoria Bastecki-Perez, Ed.D.	Date: 4/20/2017

*This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.*