Database Development

*This exam is in pilot status for the 24-25 school year. No certificate is available.

Exam Information

Exam number
860

Items
30

Points
35

Prerequisites
Information Technology Fundamentals

Computer Science Principles

Recommended course length
One semester

National Career Cluster
Information Technology

Performance standards
Included (Optional)

Certificate available
No

Description

Database development is the process of creating, managing, and manipulating data using specialized software and techniques. In this course, students will learn the basics of database design, implementation, and query languages. Students will gain hands-on experience with SQL, a standard language for accessing and manipulating data in relational databases. This course will provide students with the necessary skills to pursue academic and professional opportunities in the field of database development.

Exam Blueprint

Standard	Percentage of exam
1. Database Fundamentals	9%
2. Understanding structured data	54%
3. Database Design	26%
4. Data Security and stability	11%

Standard 1

Database Fundamentals

Objective 1 Data Storage Ethics

1. Identify ethical issues within the industry.
    a. Personal Identifying Information (PII)
    a. Proprietary data

Objective 2 History of Databases

1. Historical database systems
2. Understand what a relational database is.
3. Understand the need for relational data management systems (RDMS).

Objective 3 Opportunities

1. Identify career opportunities in the database industry (DBA (Database Administrator), programmer, reporting programmer, database designer, and database developer).

Standard 2

SQL (Structured Query Language) languages subsets of database development

Objective 1 Data Query Language (DQL)

1. Demonstrate simple one table selects.
2. Limit results of a SELECT with WHERE
3. Check for NULL values.
4. Demonstrate joined tables using inner
5. Understand what a Cartesian product is and how to avoid creating one.
6. Demonstrate sorting with ORDER BY.
7. Demonstrate the use of standard functions.
8. Demonstrate grouping with aggregate functions.
9. Limit results with HAVING
10. Demonstrate outer joins

Objective 2 Data Definition Language (DDL)

1. Create a database.
2. Create objects in a database.
3. Maintenance of the database and objects.
4. Remove database objects.

Objective 3 Data Manipulation Language (DML)

1. Demonstrate inserting data into a table.
2. Demonstrate order when inserting into parent/child tables.
3. Demonstrate updating one row updates.
4. Demonstrate multiple rows to full table updates.
5. Demonstrate deleting one row.
6. Demonstrate deleting multiple rows to full table deletes.
7. Show understanding of the difference between truncate and delete.

Objective 4 Transaction Control Language (TCL)

1. Identify transaction points
2. Revert transactions
3. Lock transactions in

Objective 5 Data Control Language (DDL)

1. Grant rights to database objects.
2. Revoke rights to database objects.

Standard 3

Database Design

Objective 1 Normalization

1. Identify the major steps of data normalization
    a. Raw data
    a. First Normal Form (1NF)
    b. Second Normal Form (2NF)
    c. Third Normal Form (3NF)
    d. Boyce-Code Normal Form (BCNF)
2. Understand each level and why 3NF is the standard for normalization

Objective 2 Table Design

1. Demonstrate knowledge of relationship types. (cardinality)
    a. one to one
    a. one to many
    b. many to many
2. Demonstrate knowledge of data requirements (optionality)
3. Identify attributes for the entities.
4. Understand the reasons for keys in a database.
5. Understand choosing appropriate primary keys.
6. Understand selecting appropriate data types for keys.
7. Understand selecting appropriate fields for composite keys.
8. Understand the relationship between foreign and primary keys.

Objective 3 Table Creation

1. Create database tables using proper ANSI (American National Standards Institute) SQL syntax.
2. Define primary keys, foreign keys, unique keys, columns and rows.
3. Choose data types and understand why they are important for storage requirements.
4. Identify violations of data-integrity rules.

Standard 4

Data Security and stability

Objective 1 Security Concepts

1. Understand database security concepts.
2. Understand the need to secure a database.

3. Understand what objects can be secured.
4. Understand what objects should be secured, user accounts, and roles.

Objective 2 Data Stability

1. Understand database backups and restore.
2. Understand various backup types, such as full and incremental.
3. Understand the importance of backups.
4. Understand how to restore a database.

Performance Skills

1. Understand Database Fundamentals.
2. Know the language types of database development.
3. Create an ER (Entity Relationship) diagram
4. Implement database tables from an ER Diagram
5. Demonstrate use of data manipulation language to view, change, create and remove data in the database.
6. Understand Database Security.

Workplace Skills

Workplace skills should be practiced and improved daily in the classroom to help students become efficient and reliable employees.

1. Communication
2. Problem Solving
3. Critical Thinking
4. Dependability
5. Accountability

Database Development

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of 8 or higher on the rating scale. Students may be encouraged to repeat the objectives until they average 8 or higher.

Student's Name: _____

Class: _____

Performance standards rating scale

0	Limited skills	2	→	4	Moderate skills	6	→	8	High skills	10

Standard 1 – Database Fundamentals **Score:**

- Data Storage Ethics
- History of Databases
- Opportunities

Performance standard average score:

Evaluator Name: _____

Evaluator Title: _____

Evaluator Signature: _____

Date: _____