



CSCI 65 - Microsoft SQL Database Administration

Catalog Description

Transfer Status: CSU
Prerequisite: CSCI 49
Unit(s): 3.00
Lecture: 34.00 Contact hours/68.00 Out of class hours/102.00 Total hours/2.00 Unit(s)
Lab: 51.00 Contact hours/0.00 Out of class hours/51.00 Total hours/1.00 Unit(s)
Total: 85.00 Contact hours/68.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

Course Description: This course addresses database management, both on-premises and cloud-based, along with different approaches for storing data. In the course, students define, develop, operate, and scale both Structured Query Language (SQL) and noSQL data storage solutions and basic related applications. This course considers strategic, operational, and ethical factors that should be balanced during the design of a storage solution. Students will apply principles using a common Relational Database Management System and SQL to create and fill tables, and to retrieve and manipulate data. Object-based APIs and noSQL solutions will be covered. Topics include automated backups, transaction logs, restoration, and retention. (C-ID ITIS 180).

Objectives

- Upon successful completion of this course, the student should be able to:
1. Define the role of databases, database management systems, and related ethics and risks in a dynamic global regulatory environment.
 2. Understand basic database structure.
 3. Design a relational database so that it is at least in 3rd Normal Form.
 4. Implement a relational database design using a common database management system, including the principles of data type selection and indexing.
 5. Use the data definition, data manipulation, and data control language components of Structured Query Language (SQL) in the context of one widely used implementation of the language.
 6. Describe the role of databases and database management systems in the context of enterprise systems, including various cloud-based implementation models.
 7. Describe the key principles of data security and identify data security risk and violations in data management system design.
 8. Describe the fundamentals of Online Transaction Processing (OLTP) and Online Analytic Processing (OLAP), and how they relate to business intelligence, data warehousing, and data mining.
 9. Describe business continuity considerations related to database management.
 10. Demonstrate the basics of monitoring, managing, backing up, restoring, and securing database instances.

Course Content

Topic Titles / Suggested Time Topic	
<u>Lecture</u>	
<u>Topics</u>	<u>Lec Hrs</u>
Introduction to Databases	2.50
Conceptual Data Modeling and Database Design	2.50
The Relational Data Model and Structured Query Language (SQL)	2.50
Database Programming Techniques	2.50
Database Objects	2.50
Database Design Theory and Normalization	2.00
File Structures, Hashing, Indexing, and Physical Database Design	2.50
Query Processing and Optimization	2.50
Transaction Processing, Concurrency Control, and Recovering	2.50
Distributed databases, NoSQL systems, cloud computing, and Big Data	2.50
Advanced database models, systems, and applications	2.50
Database Administration	4.00
Business continuity	3.00
Total Hours: 34.00	
<u>Lab</u>	
<u>Topics</u>	<u>Lab Hrs</u>
Introduction to Databases	4.00

Topics	Lab Hrs
Conceptual Data Modeling and Database Design	3.50
The Relational Data Model and Structured Query Language (SQL)	4.00
Database Programming Techniques	3.50
Database Objects	4.00
Database Design Theory and Normalization	3.00
File Structures, Hashing, Indexing, and Physical Database Design	3.50
Query Processing and Optimization	4.00
Transaction Processing, Concurrency Control, and Recovering	4.00
Distributed databases, NoSQL systems, cloud computing, and Big Data	4.00
Advanced database models, systems, and applications	4.00
Database Administration	5.50
Business Continuity	4.00
Total Hours:	51.00

Methods of Instruction

- A. Demonstrations
- B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- C. Lecture
- D. Multimedia Presentations

Methods of Evaluation

- A. Lab Projects
- B. Written Assignments
- C. Written Examinations
- D. Practical Evaluations

Examples of Assignments

Reading Assignments

1. Read the Microsoft white paper, "Application and Multi-Server Management," available at Microsoft TechNet online. Be prepared to discuss the major features of SQL Server Management Studio in class.
2. Read the chapter in your book that describes server and database roles. Write a brief description of each of the following: server roles, fixed database roles, user-defined database roles. Be prepared to discuss these roles in class.

Writing Assignments

1. Review the SQL Server documentation for the installation and configuration of SQL Server. Write a detailed 3 page procedure that can be used to guide the upgrade and automated installation of SQL Server.
2. Write a one page summary of the various tools and techniques available to identify and troubleshoot service-related issues, concurrency issues, and login and connectivity issues on a SQL Server.

Out-of-Class Assignments

1. Attend the Pragmatic Works webinar, "SQL Server Distributed Replay." Using what you learn in the webinar, write a 1 page assessment of expected impacts of the hardware and operating system upgrades proposed in the scenario provided by the instructor.
2. Go to a local store, review an invoice, receipt, or another item to identify the inventory/customer/vendor database objects. Theorize the underlying database structure and write a 1-page analysis. Be prepared to discuss with your classmates.

Recommended Materials of Instruction

Elmasri, R. & Navathe, S. (2016). Fundamentals of Database Systems. *Pearson*, 7th. 978-0133970777.

Kroenke, D. M. & Auer, D. (2020). Database Concepts. *Pearson*, 9th. 9780135188149.

Other Learning Materials

Access to MS Learn online content

Minimum Qualifications

Computer Information Systems
 Computer Service Technology
 Computer Science (Masters Required)

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