BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

CSCI 65 - Microsoft SQL Database Administration **3 Unit(s)**

Prerequisite(s): CSCI 49
Recommended Prep: Reading Level IV; English Level IV; Math Level III
Transfer Status: CSU
34 hours Lecture
51 hours Lab

This course prepares students to take the Microsoft Technology Associate (MTA) certification exam for Microsoft Structured Query Language (SQL) Server. Students learn to install and configure a database, create fields, tables, and objects, manipulate data, and administer and troubleshoot a Microsoft SQL Server database. Topics include server instances, server components, security, backup and recovery, performance and availability.

II. **OBJECTIVES**

Upon successful completion of this course, the student will be able to:

A. Install and configure Microsoft SQL Server and related services.
B. Configure and manage Microsoft SQL Server instances.
C. Create and manage Microsoft SQL Server databases.
D. Create and manage a variety of database indexes.
E. Manage Microsoft SQL Server security including logins, server roles, database roles, and permissions on server instances, databases, schema, and objects.
F. Manage data on a Microsoft SQL Server using data partitions and data compression.
G. Identify and address Microsoft SQL Server service problems including concurrency issues and job execution errors.
H. Plan for and manage backup and recovery operations for a Microsoft SQL Server database.
I. Optimize and troubleshoot Microsoft SQL Server Database system activities including cache hits, connections, locks, memory allocation, Online Transaction Processing (OLTP), recompilation, and transactional throughput.
J. Optimize hardware resource usage including the Central Processing Unit (CPU), disk Input/Output (I/O), and memory.
K. Identify, differentiate, and utilize data definition language (DDL) and data manipulation language (DML).
L. Differentiate and analyze advanced SQL configurations for High Availability (HA) and Disaster Recovery (DR) and Replication. Including clustering, mirroring, AlwaysOn Availability, Merge and transactional replication.
M. Evaluate cloud integration with Azure.

III. **COURSE CONTENT**

A. **Unit Titles/Suggested Time Schedule**

Lecture

Topics	Hours
1. Database design fundamentals	2.00
2. Microsoft SQL Server installation and configuration	4.00
3. Microsoft SQL Server instances	4.00
4. Microsoft SQL Server database management and configuration	4.00

5. Logins, roles, and permissions	5.00
6. Data partitions and data compression	2.00
7. Database indexes	2.00
8. Monitoring and troubleshooting SQL Server	3.00
9. Disaster recovery	2.00
10. Optimizing Microsoft SQL Server performance	3.00
11. Implementing high availability	2.00
12. Security best practices	1.00
Total Hours	34.00

Lab

Topics	Hours
1. Database design fundamentals	3.00
2. Microsoft SQL Server installation and configuration	6.00
3. Microsoft SQL Server instances	6.00
4. Microsoft SQL Server database management and configuration	6.00
5. Logins, roles, and permissions	7.50
6. Data partitions and data compression	3.00
7. Database indexes	3.00
8. Monitoring and troubleshooting Microsoft SQL Server	4.50
9. Disaster recovery	3.00
10. Optimizing Microsoft SQL Server performance	4.50
11. Implementing high availability	3.00
12. Security best practices	1.50
Total Hours	51.00

IV. **METHODS OF INSTRUCTION**

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

V. **METHODS OF EVALUATION**

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

VI. **EXAMPLES OF ASSIGNMENTS**

A. 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.

B. Writing Assignments
   1. 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.
   2. 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.

C. Out-of-Class Assignments
   1. Go to a local bookstore and identify and assess the books available to help Information Technology (IT) professionals prepare for the Microsoft SQL Server certification exams. Be prepared to share any recommendations you have for your classmates for exam preparation supplemental materials.
   2. 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.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**

Textbooks:

A. Jorgensen, A., Ball, B., Wort, S., LoForte, R., Knight, B. Professional Microsoft SQL Server 2014 Administration. 1st Edition. Wiley, 2014.

B. Microsoft Official Academic Course. MTA 98-364: Database Fundamentals. 1st Edition. Wiley, 2012.

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