ITS411: PRINCIPLES OF DATABASE SECURITY

Credit Hours: 3

Contact Hours: This is a 3-credit course, offered in accelerated format. This means that 16 weeks of material is covered in 8 weeks. The exact number of hours per week that you can expect to spend on each course will vary based upon the weekly coursework, as well as your study style and preferences. You should plan to spend 14-20 hours per week in each course reading material, interacting on the discussion boards, writing papers, completing projects, and doing research.

Faculty Information: Faculty contact information and office hours can be found on the faculty profile page.

COURSE DESCRIPTION AND OUTCOMES

Course Description:

This course will provide students with an understanding of concepts and techniques that can be utilized to create secure database systems. Students will learn secure data models that can be used in database development. Students will identify appropriate access control mechanisms and trust management techniques that can be integrated into a database system.

Course Overview:

Database security has a great impact on the design of today's information systems. This course will provide an overview of database security concepts and techniques and discuss new directions of database security in the context of internet information management. The topics include database application security models, database and data auditing, access control, trust management, and privacy protection.

Course Learning Outcomes:

1. Discuss secure database features.
2. Identify security models in database system development.
3. Implement trust management techniques in a database system.
4. Create access control mechanisms in a database system.
5. Implement security models in a database system.
6. Create an audit plan for a secure database system.

PARTICIPATION & ATTENDANCE

Prompt and consistent attendance in your online courses is essential for your success at CSU Global. Failure to verify your attendance within the first 7 days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact your Student Success Counselor.

Online classes have deadlines, assignments, and participation requirements just like on-campus classes. Budget your time carefully and keep an open line of communication with your instructor. If you are having technical problems, problems with your assignments, or other problems that are impeding your progress, let your instructor know as soon as possible.

COURSE MATERIALS

Required:

N/A - Weekly scholarly articles from the CSU Global Library to be used in lieu of a textbook.

Required materials:

MySQL: https://dev.mysql.com/downloads/installer/

NOTE: All non-textbook required readings and materials necessary to complete assignments, discussions, and/or supplemental or required exercises are provided within the course itself. Please read through each course module carefully.

COURSE SCHEDULE

Due Dates

The Academic Week at CSU Global begins on Monday and ends the following Sunday.

- **Discussion Boards:** The original post must be completed by Thursday at 11:59 p.m. MT and peer responses posted by Sunday 11:59 p.m. MT. Late posts may not be awarded points.
- **Opening Exercises:** Take the opening exercise before reading each week's content to see which areas you will need to focus on. You may take these exercises as many times as you need. The opening exercises will not affect your final grade.
- **Mastery Exercises:** Students may access and retake mastery exercises through the last day of class until they achieve the scores they desire.
- **Critical Thinking:** Assignments are due Sunday at 11:59 p.m. MT.

WEEKLY READING AND ASSIGNMENT DETAILS

Module 1

Readings

- Crelin, J. (2018). Database security. *Salem Press Encyclopedia*.
- Gray, J. (2019). Basic principles of database security. *ISSA Journal*, *17*(4), 22–27.
- Hawley, D. (2019). Database security: Ensuring that the database course can serve cybersecurity students as well as traditional computer science students. *Proceedings of the International Conference on Cyber Warfare & Security*, 116–122.
- Kelly, T. S., & Shaxted, A. (2019). Protecting information assets against insider threats. *ISSA Journal*, *17*(4), 28–31.

Discussion (25 points)

Organizations take great measures to ensure the secure design of their organizational architecture. Discuss the ways users can harm this architecture if they are not properly trained. Include in your discussion the policies and procedures that you will recommend to ensure that users support the security of your network to ensure the safety of its databases.

Be sure to post an initial, substantive response by Thursday at 11:59 p.m. MST and respond to 2 or more peers with substantive responses by Sunday at 11:59 p.m. MST. A substantive initial post answers the question presented completely and/or asks a thoughtful question pertaining to the topic. Substantive peer responses ask a thoughtful question pertaining to the topic and/or answer a question (in detail) posted by another student or the instructor.

Critical Thinking: Title (70 points)

OPTION #1: Assessing and Prioritizing Risks

You have been hired as a security professional in the current CSU Global environment. Your department has experienced a recent breach within its database architecture. Your manager feels it is time to reassess the network as a first step in a phased approach to hardening the network security. You have been delegated to lead this assessment. In your paper, discuss the database architecture and describe your assessment process. Include the following information in your paper:

- Define who would be included in the assessment of the database environment.

- Identify the assets that you are protecting.

- Define the threats you are protecting against.

- Using the following table, assign a risk value to each threat, based on its likelihood and cost to the company.

- Prioritize your threats based on their risk value (5 being the highest risk and 1 being the lowest).

	High Cost	Medium Cost	Low Cost
High Probability	5	4	3
Medium Probability	4	3	2
Low Probability	3	2	1

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least three scholarly resources in your paper. The CSU Global Library is a good place to find these references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

OPTION #2: Overview of Databases

For this week's Critical Thinking Assignment, answer the following questions in a properly formatted research paper.

- What is a database?

- What is the main goal of a DBMS?

- What are the common components found within DBMSs?

In addition, provide an example of a database used in practice. Feel free to draw examples from previous experience or scholarly research.

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least three scholarly resources in your paper. The CSU Global Library is a good place to find these references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

Mastery Exercise (10 points)

Module 2

Readings

- McKendrick, J. (2018). Is today's data market OUTGROWING the relational database model? *Database Trends and Applications, 32*(4), 4-8.
- MySQL (2020). Overview of MySQL storage engine architecture. *MySQL 5.6 Reference Manual*. https://dev.mysql.com/doc/refman/5.6/en/pluggable-storage-overview.html
- Ronnie, M. (2015). Reliability and relevance of data mining for modern age database management system as well as management information system. *Scholedge International Journal of Management & Development*, *2*(5), 56–63.
- Yaseen, Q., Althebyan, Q., Panda, B., & Jararweh, Y. (2016). Mitigating insider threat in cloud relational databases. *Security & Communication Networks*, *9*(10), 1132–1145. doi.org/10.1002/sec.1405

Opening Exercise (0 points)

Discussion (25 points)

Different database models were discussed in our interactive lecture this week. Pick one of the database models to describe to your peers. In your discussion, also share a scenario in which the chosen database model would be an ideal choice.

Be sure to post an initial, substantive response by Thursday at 11:59 p.m. MST and respond to 2 or more peers with substantive responses by Sunday at 11:59 p.m. MST. A substantive initial post answers the question presented completely and/or asks a thoughtful question pertaining to the topic. Substantive peer responses ask a thoughtful question pertaining to the topic and/or answer a question (in detail) posted by another student or the instructor.

OPTION #1: Improving a System

A convenience store located within an apartment complex uses a log similar to the following one to keep track of customer purchases. The goal of the database is to keep track of the inventory sold in hopes of using the data to better meet customers' convenience store needs. From the information gathered, the storeowner is able to obtain statistics that help them plan future inventory. Data such as the number of products sold, the most and least frequently purchased products, the frequency and amount of customer purchases, and the total purchases made by a specific apartment aid the owner in determining how best to suit customers' needs.

Write a paper that discusses how you might achieve the owner's goal in a more efficient manner using a database. Answer the following questions in your paper:

- What database model would you implement?

- What type of database fits this scenario best?

- What DBMS is best suited for this scenario, and why?

- What would be the cost of implementing your proposed system?

- How would training and maintenance of the system be handled?

Customer Name	Apt #	Product Name	Product Price	# Purchased
Joseph Anthony	1125	Orange Juice	4.59	1
Joseph Anthony	1125	Loaf Bread	2.29	1
Steve Miller	2221	Gum	.99	1
Yolanda Burns	3221	Milk	3.67	1
Yolanda Burns	3221	Candy Bar	1.19	3
Logan Lin	2239	Loaf Bread	2.29	1
KK Jordan	1138	Gum	.99	2

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least two scholarly resources in your paper. The CSU Global Library is a good place to find these references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

OPTION #2: Building a Relational Database

You have been hired to design a relational database for a convenience store, which is located within an apartment complex. The goal of the database is to keep track of the inventory sold in hopes of using the data to better meet the customers' convenience store needs. Up until your arrival, the store kept track of each customer's purchases using a flat database log, as shown in the following table. Using the

information provided, build a relational database that will allow for querying things such as products sold, customer purchases, total apartment purchases, and total spent per apartment. Include any created tables and identify the keys and key types that are used. Identify all relationships, labeling them 1:1, 1:N, or M:N.

Customer Name	Apt #	Product Name	Product Price	# Purchased
Joseph Anthony	1125	Orange Juice	4.59	1
Joseph Anthony	1125	Loaf Bread	2.29	1
Steve Miller	2221	Gum	.99	1
Yolanda Burns	3221	Milk	3.67	1
Yolanda Burns	3221	Candy Bar	1.19	3
Logan Lin	2239	Loaf Bread	2.29	1
KK Jordan	1138	Gum	.99	2

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. In your paper should be screenshots of your relational database along with descriptions of the images. Additionally, include at least one scholarly resource in your paper. The CSU Global Library is a good place to find references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

Mastery Exercise (10 points)

Module 3

Readings

- Castro, K. (2018). Security, integrity, and authorization in DBMS. https://www.tutorialspoint.com/Security-Integrity-and-Authorization-in-DBMS
- Chartio. (2020). How to grant all privileges on a database in MySQL. https://chartio.com/resources/tutorials/how-to-grant-all-privileges-on-a-database-in-mysql/
- Davison, A. (2019). Powerful password and authentication tools for improving the use of online legal research databases: Using new password management tools and single sign-on (SSO) authentication to increase security and provide a better user experience. *AALL Spectrum, 24*(2), 39–41.
- Linuxize.com. (2020). How to manage MySQL databases and users from the command line. https://linuxize.com/post/how-to-manage-mysql-databases-and-users-from-the-command-line/
- Wang, X. A., Weng, J., Ma, J., & Yang, X. (2019). Cryptanalysis of a public authentication protocol for outsourced databases with multi-user modification. *Information Sciences, 488*, 13–18.
- Wee, C. K., & Nayak, R. (2019). A novel machine learning approach for database exploitation detection and privilege control. *Journal of Information & Telecommunication, 3*(3), 308. https://www.tandfonline.com/doi/full/10.1080/24751839.2019.1570454

Discussion (25 points)

Explain the principle of least privilege and how it should be applied within a database environment. In your discussion, also identify two or three actions that can be applied to a database environment to manage user access.

Be sure to post an initial, substantive response by Thursday at 11:59 p.m. MST and respond to 2 or more peers with substantive responses by Sunday at 11:59 p.m. MST. A substantive initial post answers the question presented completely and/or asks a thoughtful question pertaining to the topic. Substantive peer responses ask a thoughtful question pertaining to the topic and/or answer a question (in detail) posted by another student or the instructor.

Mastery Exercise (10 points)

Critical Thinking: Title (60 points)

OPTION #1: Securing the Database Environment

You have been hired as the DBA for Haphazard, Inc. You are asked to fulfill the following needs of the MySQL Database environment.

Users, roles, and privileges need to be added to the database. Identify the statements that would be used for creating the following users, roles, and privileges that match the following requirements:

- Create a user account LMakena identified by the password DelKen75.

- Grant LMakena the SELECT and UPDATE permissions on the table called clients.

- Create a user account CRobertson identified by the password TreSal37.

- Grant CRobertson the select and delete permissions on the table called clients.

- Create a user account TMasters identified by the password 77FwdAsme.

- Grant TMasters the select and insert permissions on the table called clients.

- Create a role named Most_Privileged without a password.

- Grant the Most_Privileged role the Update and Delete permissions on the clients table.

- Add all users to the Most_Privileged role

Please include the proper statements for each of the above items in your submission (as well as screenshots of adding these users, roles, and privileges to the MySQL database). Additionally, provide a 2-page essay answering the following prompt:

What security suggestions would you provide to Haphazard, Inc. in terms of authentication and authorization? Explain what policies you would develop as well.

Your paper should be 3-4 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least three scholarly references in addition to the course textbook. The CSU Global Library is a good place to find these references. If you need assistance

with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

OPTION #2: MySQL User Management

Define a set of standards and policies for adding, modifying, and removing users from a database. Then, identify how to create a user in MySQL. Write the steps for creating a user in MySQL with a detailed flowchart. Finally, provide a scenario in which a role is assigned to another role to fulfill a specific need.

Your paper should be 4-5 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least three scholarly references in addition to the course textbook. The CSU Global Library is a good place to find these references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

Portfolio Milestone (50 points)

OPTION #1: Defense in Depth Strategy Outline

Review the Portfolio Project description below. For this week's milestone, your task is to provide an outline that you'll use to write your final project. Included in the outline must be a detailed abstract for your research paper (at least one paragraph).

Additionally, you must find at least six resources that you plan to use when writing the final project.

For the purpose of this milestone, you will write the outline for the Portfolio Project. Your outline should meet the following requirements:

- Be approximately 2-3 pages in length, not including the title page and reference page.

- Follow APA guidelines in the CSU Global Writing Center. Your outline must include the overview (or introduction) section.

- Cite a minimum of six scholarly sources—academic and peer-reviewed—to support your positions, claims, and observations. The CSU Global Library is a great place to find resources.

- Be clear, well written, concise, and logical, using excellent grammar and style techniques. You are being graded in part on the quality of your writing. If you need assistance with your writing style, start with the resources on the Writing Tutorials page of the CSU Global Writing Center.

Review the grading rubric to see how you will be graded for this assignment.

Portfolio Project Description:

No single security solution can properly protect a database. Defense-in-Depth is a security implementation, which has layers of security implemented to protect an asset from unauthorized access or modification. For your Portfolio Project, you will design a defense-in-depth architecture for database environments. In your research paper, be sure to include information on multi-layer database access control architecture. Feel free to include illustrations and/or diagrams in your project.

OPTION #2: Analysis of Recent Security Breaches Outline

Review the Portfolio Project description below. For this week's milestone, your task is to select a recent security breach (within the last three years) and provide an outline that you'll use to write your final

project. Included in the outline must be a detailed overview section (at least one paragraph) discussing the security breach in detail.

Additionally, you must find at least six resources that you plan to use when writing the final project.

For the purpose of this milestone, you will write the outline for the Portfolio Project. Your outline should meet the following requirements:

- Be approximately 2-3 pages in length, not including the cover page and reference page.

- Follow APA guidelines in the CSU Global Writing Center. Your outline must include the overview (or introduction) section.

- Cite a minimum of six scholarly sources—academic and peer-reviewed—to support your positions, claims, and observations. The CSU Global Library is a great place to find resources.

- Be clear, well written, concise, and logical, using excellent grammar and style techniques. You are being graded in part on the quality of your writing. If you need assistance with your writing style, start with the resources on the Writing Tutorials page of the CSU Global Writing Center.

Review the grading rubric to see how you will be graded for this assignment.

Portfolio Project Description:

Analyze a security breach that has occurred in the recent past (within the last three years). In your critical evaluation of the chosen security breach, review and analyze the breach along the following dimensions:

1. What went wrong?
2. Why did it occur?
3. Who was responsible?
4. What were the consequences to the organization?
5. How could it have been prevented?
6. What advice would you offer to prevent such a breach from occurring in the future?

Module 4

Readings

· Boussaïd, O., Darmont, J., Bentayeb, F., & Loudcher, S. (2017). Warehousing complex data from the Web. *International Journal of Web Engineering and Technology*, 1-26.
· Devlin, B. (2018). Thirty years of data warehousing. *Business Intelligence Journal, 23*(1), 12–24.
· Dewey, J. (2019). Big data. *Salem Press Encyclopedia*.
· Silva, Y., Almeida, I., & Queiroz, M. (2016, March 2–5). SQL: From traditional databases to big data [Conference paper]. *SIGCSE'16,* Memphis, Tennessee. 10.1145/2839509.2844560. http://www.public.asu.edu/~ynsilva/publications/SQLinBigData.pdf
· Tantawi, R. (2018). Data warehouse. *Salem Press Encyclopedia*.

Opening Exercise (0 points)

Discussion (25 points)

Many different trends necessitate data warehousing in most organizations. Discuss one of these trends, including any major components of the data warehouse architecture. Additionally, share an example of the data warehouse trend used in practice within an organization today.

Be sure to post an initial, substantive response by Thursday at 11:59 p.m. MST and respond to 2 or more peers with substantive responses by Sunday at 11:59 p.m. MST. A substantive initial post answers the question presented completely and/or asks a thoughtful question pertaining to the topic. Substantive peer responses ask a thoughtful question pertaining to the topic and/or answer a question (in detail) posted by another student or the instructor.

Mastery Exercise (10 points)

Critical Thinking: Title (60 points)

OPTION #1: Data Warehouses

Data warehouse technology has changed the way that global organizations conduct business. Many have found it impossible to create a business strategy without a data warehouse. Define the concept of a data warehouse and then describe the business uses for one. In your research paper, focus on data warehouse management, including its components. Additionally, discuss the assurance of safety and privacy to maintain data integrity. Lastly, include a discussion on the availability and reliability of the data warehouse. You may also want to investigate different management tools used to maintain data warehouses.

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least three scholarly references in addition to the course textbook. The CSU Global Library is a good place to find these references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

OPTION #2: Big Data

Big data has been evolving tremendously for the past several years. Describe the three main characteristics of big data. Additionally, discuss the main considerations in processing big data. To illustrate your research on big data, find a company that is well known for using big data to discuss the characteristics and considerations of big data in more detail. Lastly, what demands do you feel big data is placing on organizations and data management technology?

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least three scholarly references in addition to the course textbook. The CSU Global Library is a good place to find these references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

Module 5

Readings

- Marting, J. A. (2019). What is access control? A key component of data security. *CSO Online*. https://www.csoonline.com/article/3251714/what-is-access-control-a-key-component-of-data-security.html
- Matulevičius, R., & Lakk, H. (2015). A model-driven role-based access control for SQL databases. *Complex Systems Informatics and Modeling Quarterly*, (3), 35.

Opening Exercise (0 points)

Discussion (25 points)

As we read this week, access control is a method of allowing access to a company's sensitive data only to the database users allowed to access said data. Can organizations achieve perfect access control? Why or why not? Be sure to provide valid justifications in your post. Be sure to also share examples from conducted research.

Be sure to post an initial, substantive response by Thursday at 11:59 p.m. MST and respond to 2 or more peers with substantive responses by Sunday at 11:59 p.m. MST. A substantive initial post answers the question presented completely and/or asks a thoughtful question pertaining to the topic. Substantive peer responses ask a thoughtful question pertaining to the topic and/or answer a question (in detail) posted by another student or the instructor.

Mastery Exercise (10 points)

Critical Thinking: Title (60 points)

OPTION #1: Database System Security

Database systems cannot stand alone; they depend on many other systems. Therefore, database security is a combination of many other associated and correlated systems. Choose an industry from e-commerce, healthcare, or banking and discuss database security for an organization in one of those industries. Be sure to discuss the confidentiality, availability, and integrity of the database system. Explain the techniques the organization should use to keep the database secure and what to do if confidentiality, availability, or integrity are compromised.

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least four scholarly resources in your paper. The CSU Global Library is a good place to find these references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

OPTION #2: Database Security Model

Considering the importance of data in organization, it is absolutely essential to secure the data present in the database. What are the strategic and technical security measures for good database security? Be sure to discuss at least one security model to properly develop databases for organizational security. Feel free to create a diagram of a security model for your paper.

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least four scholarly resources in your paper. The CSU Global Library is a good place to find these references. If you need assistance with your writing style

or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

Module 6

Readings

- Berk, A., Gamzayev, R. O., Karaçuha, E., & Tkachuk, M. V. (2018). Algorithms and software solutions for SQL injection vulnerability testing in web applications. *Вісник Національного Технічного Університету "ХПІ": Серія: Системний Аналіз, Управління Та Інформаційні Технології*, (22), 1–8. http://samit.khpi.edu.ua/article/view/2079-0023.2018.22.01/139558
- Horner, M., & Hyslip, T. (2017). SQL injection: The longest running sequel in programming history. *Journal of Digital Forensics, Security & Law, 12*(2), 97–108.
- Sheposh, R. (2017). SQL injection. *Salem Press Encyclopedia of Science*.

Opening Exercise (0 points)

Discussion (25 points)

Discuss one strategy for executing a SQL injection. Include in your post the difference between dynamic and static SQL statements with at least one example to support your discussion.

Be sure to post an initial, substantive response by Thursday at 11:59 p.m. MST and respond to 2 or more peers with substantive responses by Sunday at 11:59 p.m. MST. A substantive initial post answers the question presented completely and/or asks a thoughtful question pertaining to the topic. Substantive peer responses ask a thoughtful question pertaining to the topic and/or answer a question (in detail) posted by another student or the instructor.

Mastery Exercise (10 points)

Critical Thinking: Title (60 points)

OPTION #1: Exploitation Awareness

Kaiden is a security consultant for Banner Financial, a large mortgage lending company in Atlanta. He has been hired to raise the company DBA's awareness about SQL injections.

1. Kaiden is giving a speech on the four steps of exploitation. What four steps do you anticipate him including within his speech?
2. Kaiden is planning to describe at least three ways a database management system can be identified. What three ways for identifying a DBMS should he cover?
3. Kaiden plans to provide a few examples of SQL statements that can be used to gather information externally. Provide two examples of SQL statements that he can provide.
4. What suggestions do you expect Kaiden to provide for securing the company databases against SQL injections?

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least four scholarly resources in your paper. The CSU Global Library is a good place to find these references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

OPTION #2: Securing the Environment

You have been hired as the security consultant for a law firm. As your first task, you have been asked to complete a security audit of their web applications. Answer the following questions in your research paper:

1. What are the first steps that you would take to test the sites for SQL injection vulnerability?
2. How might you apply the concept of inferential testing?
3. What is your strategy for identifying dangerous source code now and far into the future?
4. What suggestions would you offer this law firm in reference to their web clients?

Your paper should be 4-6 pages in length, not including title and references pages, and conform to APA guidelines in the CSU Global Writing Center. Include at least four scholarly resources in your paper. The CSU Global Library is a good place to find these references. If you need assistance with your writing style or you need writing tips or tutorials, visit the CSU Global Writing Center. Review the grading rubric to see how you will be graded for this assignment.

Portfolio Milestone (50 points)

OPTION #1: Defense-in-Depth Strategy Draft

For milestone 2, you will complete a short draft of the Portfolio Project. Be sure to include the abstract from Portfolio Project Milestone #1 (from Module 3).

For milestone 2 (draft), the paper requirements are as follows:

- Be 3-4 pages in length, not including the title page and reference page.

- Follow APA guidelines in the CSU Global Writing Center. Your paper should include an introduction, a body with fully developed content, and a conclusion.

- Support your answers with the readings from the course and at least four scholarly journal articles. The CSU Global Library is a great place to find resources.

- Cite a minimum of six scholarly sources—academic and peer-reviewed—to support your positions, claims, and observations.

- Be clear and well written, concise, and logical, using excellent grammar and style techniques. You are being graded in part on the quality of your writing. If you need assistance with your writing style, start with the resources on the Writing Tutorials page of the CSU Global Writing Center.

Review the grading rubric to see how you will be graded for this assignment.

The **Portfolio Project** scenario is below:

No single security solution can properly protect a database. Defense-in-Depth is a security implementation, which has layers of security implemented to protect an asset from unauthorized access or modification. For your Portfolio Project, you will design a defense-in-depth architecture for database environments. In your research paper, be sure to include information on multi-layer database access control architecture. Feel free to include illustrations and/or diagrams in your project.

OPTION #2: Analysis of Recent Security Breaches Draft

For milestone 2, you will complete the first few sections of the Portfolio Project. Include the overview from Portfolio Project Milestone #1 (from Module 3), and be sure to use the outline already drafted for milestone 1.

Analyze a security breach that has occurred in the recent past (within the last three years). In your critical evaluation of the chosen security breach, review and analyze the breach along the following dimensions:

1. What went wrong?
2. Why did it occur?
3. Who was responsible?

Your paper should meet the following requirements:

- Be 3-4 pages in length, not including the title page and reference page.

- Follow APA guidelines in the CSU Global Writing Center. Your paper should include an introduction, a body with fully developed content, and a conclusion.

- Support your answers with the readings from the course and at least four scholarly journal articles. The CSU Global Library is a great place to find resources.

- Cite a minimum of six scholarly sources—academic and peer-reviewed—to support your positions, claims, and observations.

- Be clear and well written, concise, and logical, using excellent grammar and style techniques. You are being graded in part on the quality of your writing. If you need assistance with your writing style, start with the resources on the Writing Tutorials page of the CSU Global Writing Center.

Review the grading rubric to see how you will be graded for this assignment.

Module 7

Readings

- Bornus, A. (2018). The security/compliance audit: A valuable diagnostic tool. *Corrections Today, 80*(3), 34.

- Composieux, V. (2018). Audit your MySQL or MariaDB database. *Medium.com*. https://medium.com/@vcomposieux/audit-your-mysql-or-mariadb-database-292e710b9e5e
- Maric, N. (2018). Various techniques to audit SQL server databases. *SQLShack.com*. https://www.sqlshack.com/various-techniques-to-audit-sql-server-databases/
- Rus, I. (2015). Technologies and methods for auditing databases. *Procedia Economics and Finance*, *26*, 991–999.

Opening Exercise (0 points)

Discussion (25 points)

Database audits must be conducted frequently and thoroughly to contribute to an environment's security measures. Identify and explain the different areas of concentration for database security audits. In your post, be sure to also describe the difference between a database-level audit and an application-level audit.

Be sure to post an initial, substantive response by Thursday at 11:59 p.m. MST and respond to 2 or more peers with substantive responses by Sunday at 11:59 p.m. MST. A substantive initial post answers the

question presented completely and/or asks a thoughtful question pertaining to the topic. Substantive peer responses ask a thoughtful question pertaining to the topic and/or answer a question (in detail) posted by another student or the instructor.

Mastery Exercise (10 points)

Module 8

Readings

- 360Logica.com. (2020). What are the different methodologies for penetration testing? https://www.360logica.com/blog/different-methodologies-penetration-testing/
- Antunes, N., & Vieira, M. (2017). Designing vulnerability testing tools for web services: Approach, components, and tools. *International Journal of Information Security, 16*(4), 435–457.
- Guru99. (2020). What is security testing? https://www.guru99.com/what-is-security-testing.html
- Paráda, I. (2018). Basic of cybersecurity penetration test. *Hadmérnök, 13*(3), 435–442.
- SECJuice.com. (2019). A hacking methodology explainer. https://www.secjuice.com/hacking-methodology-eli5/

Opening Exercise (0 points)

Discussion (25 points)

Last week, we discussed security auditing. This week, we will discuss security testing. In our discussion forum this week, please discuss how security testing differs from security auditing. Additionally, describe a scenario in which a security test would be a better fit than a security audit.

Be sure to post an initial, substantive response by Thursday at 11:59 p.m. MST and respond to 2 or more peers with substantive responses by Sunday at 11:59 p.m. MST. A substantive initial post answers the question presented completely and/or asks a thoughtful question pertaining to the topic. Substantive peer responses ask a thoughtful question pertaining to the topic and/or answer a question (in detail) posted by another student or the instructor.

Mastery Exercise (10 points)

Portfolio Project (250 points)

OPTION #1: Defense-in-Depth Strategy

No single security solution can properly protect a database. Defense-in-Depth is a security implementation, which has layers of security implemented to protect an asset from unauthorized access or modification. For your Portfolio Project, you will design a defense-in-depth architecture for database environments. In your research paper, be sure to include information on multi-layer database access control architecture. Feel free to include illustrations and/or diagrams in your project.

Your paper should meet the following requirements:

- Be 8-10 pages in length, not including the title page and reference page.

- Follow APA guidelines in the CSU Global Writing Center. Your paper should include an introduction, a body with fully developed content, and a conclusion.

- Support your answers with the readings from the course and at least four scholarly journal articles. The CSU Global Library is a great place to find resources.

- Cite a minimum of 10 external sources—six of which should be academic and peer-reviewed scholarly sources—to support your positions, claims, and observations.

- Be clear and well written, concise, and logical, using excellent grammar and style techniques. You are being graded in part on the quality of your writing. If you need assistance with your writing style, start with the resources on the Writing Tutorials page of the CSU Global Writing Center.

Review the grading rubric to see how you will be graded for this assignment.

OPTION #2: Analysis of Recent Security Breaches

Analyze a security breach that has occurred in the recent past (within the last three years). In your critical evaluation of the chosen security breach, review and analyze the breach along the following dimensions:

1. What went wrong?
2. Why did it occur?
3. Who was responsible?
4. What were the consequences to the organization?
5. How could it have been prevented?
6. What advice would you offer to prevent such a breach from occurring in the future?

Your paper should meet the following requirements:

- Be 8-10 pages in length, not including the title page and reference page.

- Follow APA guidelines in the CSU Global Writing Center. Your paper should include an introduction, a body with fully developed content, and a conclusion.

- Support your answers with the readings from the course and at least four scholarly journal articles. The CSU Global Library is a great place to find resources.

- Cite a minimum of 10 external sources—six of which should be academic and peer-reviewed scholarly sources—to support your positions, claims, and observations.

- Be clear and well written, concise, and logical, using excellent grammar and style techniques. You are being graded in part on the quality of your writing. If you need assistance with your writing style, start with the resources on the Writing Tutorials page of the CSU Global Writing Center.

Review the grading rubric to see how you will be graded for this assignment.

COURSE POLICIES

Grading Scale	
A	95.0 – 100
A-	90.0 – 94.9
B+	86.7 – 89.9
B	83.3 – 86.6
B-	80.0 – 83.2
C+	75.0 – 79.9
C	70.0 – 74.9
D	60.0 – 69.9
F	59.9 or below

Course Grading

20% Discussion Participation
0% Opening Exercises
8% Mastery Exercises
37% Critical Thinking Assignments
35% Final Portfolio Project (and Milestones)

For information on late work and incomplete grade policies, please refer to our **In-Classroom Student Policies and Guidelines** or the Academic Catalog for comprehensive documentation of CSU-Global institutional policies.

Academic Integrity
Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /re-purposing your own work (see *CSU-Global Guide to Writing and APA Requirements* for percentage of repurposed work that can be used in an assignment), unauthorized possession of academic materials, and unauthorized collaboration. The CSU-Global Library provides information on how students can avoid plagiarism by understanding what it is and how to use the Library and Internet resources.

Citing Sources with APA Style
All students are expected to follow the *CSU-Global Guide to Writing and APA Requirements* when citing in APA (based on the APA Style Manual, 6th edition) for all assignments. For details on CSU-Global APA style, please review the APA resources within the CSU-Global Library under the "APA Guide & Resources" link. A link to this document should also be provided within most assignment descriptions in your course.

Disability Services Statement
CSU–Global is committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Disability Resource Coordinator at 720-279-0650 and/or email ada@CSUGlobal.edu for additional information to coordinate reasonable accommodations for students with documented disabilities.

Netiquette
Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say just what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and the unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom. If you have concerns about something that has been said, please let your instructor know.