American Public University System
American Military University | American Public University

ISSC290

Course Summary

Course : ISSC290 **Title :** Securing Databases
Length of Course : 8
Prerequisites : N/A **Credit Hours :** 3

Description

Course Description:

This course is an introduction study of the principles, practices, procedures, and methodologies to ensure security of data at rest within databases. It appraises the convergence between database security and associated threat vectors and attack methods. It examines database types, security architecture, platform fundamentals, user administration, password management, security models, virtual private databases, and auditing models. It reviews database security processes, security configuration techniques, and auditing checklists. Course topics include: Secure Architecture, Privilege Management, and Auditing Processes.

Course Scope:

This course is a study within the Information Assurance discipline of Database Security as it relates to database security and auditing.

Objectives

- Describe database systems and differentiate the variant splices
- Describe the role of databases in organizations
- Describe the operating context of databases and evaluate associated risks
- Evaluate database security vulnerabilities and identify mitigation corresponding techniques
- Develop a security strategy and solution for securing databases
- Design a Database Security Audit Checklist

Outline

Week 1: Databases and Security

Reading(s)

Chapters 1-2

Stronger Database Security Needed, Cyber Attacks Show

Assignment(s)

Weekly Assignment:

You have been asked to design a security policy for a database that contains very sensitive information. In 1-2 Pages, discuss five important issues that should be addressed.

Discussion:

Answer the following questions:

1. What type of queries benefit from parallel processing?
2. What are the benefits of parallel databases?
3. How does Oracle utilize memory to speed up processes?

Weekly Quiz

Week 2: MySQL Database Security

Reading(s)

Chapter 3

Securing MySQL: Step-by-Step

Assignment(s)

Weekly Assignment:

Submit a 1 Page report that describes the steps involved in resetting the root password in Windows.

Discussion:

Answer the following questions:

1. What is the purpose of the **mysql_install_db** script?
2. What are some of the problems that can occur while running the **mysql_install_db** script?
3. Why are usernames considered just as important as passwords?

Weekly Quiz

Week 3: SQL Server Database Security

Reading(s)

Chapter 4

Password Policy

Understanding Password Policy for SQL Server Logins

SQL Server Security

How to Add a User and Set User Privileges to SQL Server

Assignment(s)

Weekly Assignment:

Using the Internet as a resource, develop a security checklist for an SQL Server.

Discussion:

Answer the following questions:

1. How would you physically secure an SQL server?
2. Why would you, for security reasons, use Windows Only authentication mode?
3. Under what circumstances would you enable the SQL Mail capability?

Weekly Quiz

Week 4: Oracle Database Security

Reading(s)

Chapter 5

Introducing Oracle Database Security

Assignment(s)

Weekly Assignment:

Submit a 1 Page report that discusses the steps involved in modifying a response file.

Discussion:

Answer the following questions:

1. Why would you perform a silent installation?
2. What is the purpose of a password complexity policy?
3. Oracle offers a free download of all editions of the Oracle Database. How does the company derive benefits from this approach?

Weekly Quiz

Week 5: Password Management

Reading(s)

Chapter 6

Preventing a Brute Force or Dictionary Attack

Assignment(s)

Weekly Assignment:

In 1 page, describe the steps involved in modifying the default password policy in Oracle?

Discussion:

Answer the following questions:

1. What is the difference between a Windows Authentication and a SQL Server Authentication?
2. How does SQL Server perform authentication when a user connects from a non-trusted connection with a specified logon name and password?

3. Why is it not advisable to enable the SA account in SQL Server?

Weekly Quiz

Final Database Project Draft Due

Week 6: SQL Injection

Reading(s)

Chapters 7 and 8

Generate dynamic SQL statements in SQL Server

SQL Injection Attacks – How Find and Fix Them

SQL Injection

SQL Injection Attacks – Are You Safe?

SQL Injection Lessons from X-Force Emergency Response Investigations

Assignment(s)

Weekly Assignment:

Write a 1 Page paper that discusses the impact of SQL injections.

Discussion:

Answer the following questions:

1. What steps would you take to prevent an SQL injection attack?
2. What are advantages and disadvantages of dynamic SQL statements?
3. What types of databases are more vulnerable to SQL injections?

Weekly Quiz

Week 7: Database Security Auditing

Reading(s)

Chapter 9

Leaving an Audit Trail in Your Database

SQL Server Security Audit

8 Database Auditing: Security Considerations

Assignment(s)

Weekly Assignment:

Submit a 1 Page report that discusses the two key requirements for writing SQL Server audits to the Windows Security log.

Discussion:

Answer the following questions:

1. What is the purpose of an audit?
2. What information is contained within an audit trail?
3. What are the advantages and disadvantages of using an audit trail?

Weekly Quiz

Final Database Project Due

Week 8: Database Security Testing

Reading(s)

Chapter 10

[**Penetration Testing: The Third Party Hacker**](#)

NoSQL

Assignment(s)

Weekly Assignment:

Submit a 2 page report that discusses the steps involved in conducting black box testing.

Discussion:

Answer the following questions:

1. How do you remove a key logger?
2. What is the difference between black box testing and white box testing?
3. What can you do to prevent a port scan?

Weekly Quiz

Evaluation

The grading will be based on Weekly assignments, discussion postings, an open book final examination, and 3 research papers.

1. **Weekly Assignments:** There will be eight Weekly assignments. The assignments and exercise will count as 20% of the final grade. The Weekly assignments will follow each of the major portions of the course. These assignments should include at least 3 references and be submitted in APA formatting. Assignments should be prepared in Microsoft Word or an equivalent word processor program and uploaded into the student folder by the due date.
2. **Discussion Postings:** There will be eight discussion postings you will need to respond to. Answers should be a paragraph with a **topic sentence** that **restates the question** and **supporting sentences** using the terms, concepts, and theories from the required readings. You may respond to other students' answers using the terms, concepts and theories from the required readings. All responses should be a **courteous paragraph** that contains a **topic sentence** with good **supporting sentences**. You may respond multiple times with a continuous discussion with points and counter points. The key requirement is to express your idea and then **support your position** using the terms, concepts and theories from the required readings to demonstrate to me that you understand the material. The discussion postings will count as 20% of the final grade.

Grading:

Name	Grade %
Assignments	30.00 %
Week 1 Assignment	3.75 %
Week 2 Assignment	3.75 %
Week 3 Assignment	3.75 %
Week 4 Assignment	3.75 %
Week 5 Assignment	3.75 %
Week 6 Assignment	3.75 %
Week 7 Assignment	3.75 %
Week 8 Assignment	3.75 %
Discussions	35.00 %
Week 1 Discussion	4.38 %
Week 2 Discussion	4.38 %
Week 3 Discussion	4.38 %
Week 4 Discussion	4.38 %
Week 5 Discussion	4.38 %
Week 6 Discussion	4.38 %
Week 7 Discussion	4.38 %
Week 8 Discussion	4.38 %
Weekly Quiz	10.00 %
Week 1 Quiz	1.25 %
Week 2 Quiz	1.25 %
Week 3 Quiz	1.25 %
Week 4 Quiz	1.25 %
Week 5 Quiz	1.25 %
Week 6 Quiz	1.25 %
Week 7 Quiz	1.25 %
Week 8 Quiz	1.25 %
DB Sec Research Paper	25.00 %
Database Security Research Paper - DRAFT	10.00 %
Database Security Research Paper	15.00 %

Materials

Book Title: Database Security - the VitalSource e-book is provided inside the classroom

Author: Alfred Basta

Publication Info: VS-Cengage

ISBN: 9781435453906

Web-Based Readings

> **WEEK 1:**

Stronger Database Security Needed, Cyber Attacks Show. Retrieved November 14, 2011

WEEK 2:

Securing MySQL: Step-by-Step. Retrieved November 14, 2011

WEEK 3:

Understanding Password Policy for SQL Server Logins. Retrieved November 14, 2011

Password Policy. Retrieved November 14, 2011

SQL Server Security. Retrieved November 14, 2011

How to Add a User and Set User Privileges to SQL Server. Retrieved November 14, 2011 from http://support.microsoft.com/kb/191694

WEEK 4:

Introducing Oracle Database Security. Retrieved November 14, 2011

WEEK 5:

Preventing a Brute Force or Dictionary Attack: How to Keep the Brutes Away from Your Loot. Retrieved November 14, 2011

WEEK 6:

Generate dynamic SQL statements in SQL Server. Retrieved November 14, 2011

SQL Injection Attacks – How to Find and Fix Them. Retrieved November 14, 2011

SQL Injection. Retrieved November 14, 2011

SQL Injection Attacks – Are You Safe? Retrieved November 14, 2011

SQL Injection Lessons from X-Force Emergency Response Investigations. Retrieved November 14, 2011 from http://blogs.iss.net/archive/sql-injection-ers.html

WEEK 7:

8 Database Auditing: Security Considerations. Retrieved November 14, 2011

Best Practices – Leaving an Audit Trail in Your Database. Retrieved November 14, 2011

SQL Server Security Audit. Retrieved November 14, 2011

WEEK 8:

Penetration Testing: The Third Party Hacker. Retrieved November 14, 2011

NoSQL (2016). *Your Ultimate Guide to the Non-Relational Universe!* Retrieved on January 1, 2016

Fidelis Cybersecurity (2014). *Current Data Security Issues of NoSQL Databases.* Retrieved December 19, 2015 from https://www.fidelissecurity.com/files/NDFInsightsWhitePaper.pdf

Course Guidelines

Citation and Reference Style

- Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Tutoring

- Tutor.com offers online homework help and learning resources by connecting students to certified tutors for one-on-one help. AMU and APU students are eligible for 10 free hours* of tutoring provided by APUS. Tutors are available 24/7 unless otherwise noted. Tutor.com also has a SkillCenter Resource Library offering educational resources, worksheets, videos, websites and career help. Accessing these resources does not count against tutoring hours and is also available 24/7. Please visit the APUS Library and search for 'Tutor' to create an account.

Late Assignments

- Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. The due date for each assignment is listed under each Assignment.
- Generally speaking, late work may result in a deduction up to 15% of the grade for each day late, not to exceed 5 days.
- As a working adult I know your time is limited and often out of your control. Faculty may be more flexible if they know ahead of time of any potential late assignments.

Turn It In

- Faculty may require assignments be submitted to Turnitin.com. Turnitin.com will analyze a paper and report instances of potential plagiarism for the student to edit before submitting it for a grade. In some cases professors may require students to use Turnitin.com. This is automatically processed through the Assignments area of the course.

Academic Dishonesty

- Academic Dishonesty incorporates more than plagiarism, which is using the work of others without citation. Academic dishonesty includes any use of content purchased or retrieved from web services such as CourseHero.com. Additionally, allowing your work to be placed on such web services is academic dishonesty, as it is enabling the dishonesty of others. The copy and pasting of content from any web page, without citation as a direct quote, is academic dishonesty. When in doubt, do not copy/paste, and always cite.

Submission Guidelines

- Some assignments may have very specific requirements for formatting (such as font, margins, etc) and submission file type (such as .docx, .pdf, etc) See the assignment instructions for details. In general, standard file types such as those associated with Microsoft Office are preferred, unless otherwise specified.

Disclaimer Statement

- Course content may vary from the outline to meet the needs of this particular group.

Communicating on the Discussion

- Discussions are the heart of the interaction in this course. The more engaged and lively the exchanges, the more interesting and fun the course will be. Only substantive comments will receive credit. Although there is a final posting time after which the instructor will grade comments, it is not sufficient to wait until the last day to contribute your comments/questions on the discussion. The purpose of the discussions is to actively participate in an on-going discussion about the assigned content.
- "Substantive" means comments that contribute something new and hopefully important to the discussion. Thus a message that simply says "I agree" is not substantive. A substantive comment contributes a new idea or perspective, a good follow-up question to a point made, offers a response to a question, provides an example or illustration of a key point, points out an inconsistency in an argument, etc.
- As a class, if we run into conflicting view points, we must respect each individual's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

Identity Verification & Live Proctoring

- Faculty may require students to provide proof of identity when submitting assignments or completing assessments in this course. Verification may be in the form of a photograph and/or video of the student's face together with a valid photo ID, depending on the assignment format.
- Faculty may require live proctoring when completing assessments in this course. Proctoring may include identity verification and continuous monitoring of the student by webcam and microphone during testing.

University Policies

[Student Handbook](#)

- [Drop/Withdrawal policy](#)
- [Extension Requests](#)
- [Academic Probation](#)
- [Appeals](#)
- [Disability Accommodations](#)

The mission of American Public University System is to provide high quality higher education with emphasis on educating the nation's military and public service communities by offering respected, relevant, accessible, affordable, and student-focused online programs that prepare students for service and leadership in a diverse, global society.