MET CS 674BHA – Summer 2016: DATABASE SECURITY

SYLLABUS

Boston University Metropolitan College

Schedule	Thursday 18:00-21:30 US Eastern Time
Location	Hanscom AFB 12 Week Course 5/26/2016 to 8/11/2016
Instructor	George R. Ultrino, Jr., M.S. CIS Security
Email	gultrino@bu.edu
Office hours	by prior arrangement

COURSE DESCRIPTION

The course provides a strong foundation in database security and auditing. This course utilizes Oracle scenarios and step-by-step examples. The following topics are covered: security, profiles, password policies, privileges and roles, Virtual Private Databases, and auditing. The course also covers advanced topics such as SQL injection, and database management security issues, such as securing the DBMS, enforcing access controls, and related issues.

FORMAT

This course is presented in a classroom format utilizing Blackboard as a supplemental tool (quizzes and tests are taken on Blackboard, as well as assignment downloads and submission). Twelve sessions are planned over the course of the semester. Students are expected to attend every lecture.

OBJECTIVES

The objective we share in this course is that each student understand the application of security concepts to database technology and demonstrate the ability to work hands-on.

Specific topic objectives are:

- Understand the fundamentals of security, and how it relates to information systems
- Identify assets in your organization and their values
- Identify risks and vulnerabilities in operating systems from a database perspective
- Learn good password policies, and techniques to secure passwords in your organization
- Learn and implement administration policies for users
- Use Oracle to create policies, profiles and roles
- Understand the various database security models and their advantages or disadvantages
- Learn how to implement a Virtual Private Database using views, roles, and application context
- Gain an overview of auditing fundamentals, and create your own auditing model
- Learn the purpose and use of data dictionaries, encryption and SQL injection
- Explore an interesting research topic of your choice related to database security

PREREQUISITES

You are required to have working knowledge of a DBMS. It is assumed that you have taken CS579 or CS 669, or the requirement has been waived. *There will be an elementary database quiz at the first session.* Please contact the instructor if you use a DBMS at work, or have questions about pre-reqs.

A laptop is needed to complete the assignments and access Blackboard. If possible, I would like each student to bring a laptop to class as I mix in class exercises to reinforce points.

COURSE TEXTS

Required

Database Security and Auditing: Protecting Data Integrity and Accessibility

by Hassan A. Afyouni

Publisher: Course Technology; 1 edition (April 6, 2005)

ISBN-10: 0619215593

ISBN-13: 978-0619215590

HOWTO Secure and Audit Oracle 10g and 11g

by Ron Ben-Natan

Publisher: Auerbach Publications; 1 edition (March 10, 2009)

ISBN-10: 1420084127

ISBN-13: 978-1420084122

Optional

Effective Oracle Database 10g Security by Design

by David C. Knox

Publisher: McGraw-Hill Osborne (Oracle Press)

Readings may be assigned from research papers, articles and journals on database security. There is no need to purchase the research papers – they will be available for download.

GRADING RUBRIC

Subject mastery and evident hard work are the key things I am seeking in student performance.

Overall Grade

The following is the general weighting of grading criteria for this course.

Homework and Labs	25 %
Quizzes	20 %
Term Project	20 %
Final Exam	30 %
Class Participation	5 %

Participation Grades

When a student participates in a class discussion I will be looking for the following qualities:

- Applicability to the topic under discussion
- Responsiveness to the points raised by others
- Demonstration of conceptual mastery

Project Evaluation Criteria

The term project must include a word processing document of 2000-3000 words. Powerpoint or other slide decks will *not be accepted*. Acceptable formats are Word, HTML, PDF. Collections of files, including source code, may be combined into a single ZIP-format file for submission.

The term project should explore or present original material in database security. You may choose your own project topic or choose from a selected topic. We will be discussing project topics in class, after which you will submit the topic you want to explore. Project topics are subject to instructor approval.

The following characteristics will be used to grade the term project:

- Application of basic security concepts to the specific topic
- Demonstrated understanding of technologies involved
- Proper academic formatting including table of contents, abstract, APA style
- Describe methodology
- Comprehensiveness and depth
- Demonstrates technology
- Regulations and standards
- Helpful contrasts
- Coherent
- References in proper format

Not Required in Grade

- Exceptional native intelligence
- Substantial personal experience in topic
- Witty repartée

Late or Missed Work

In case of personal emergency or other circumstances that prevent you from fulfilling an assignment, taking a quiz or test, or attending class, please contact me before it is due.

Grade penalties for late submission may be waived if you provide this level of notice along with a reasonable and credible explanation.

Course grade will be penalized 10 points for being up to 24 hours late, 20 points up to 48 hours late. After 48 hours, a zero is awarded.

ACADEMIC INTEGRITY

- *WRITE IT, OR CITE IT!*

Please download and review the Policy on Academic Conduct from the following page:

http://www.bu.edu/met/for-students/met-policies-procedures-resources/academic-conduct-code/

Neither the University, nor I, nor your classmates can tolerate plagiarism in any formal submission for this class. Please show appropriate respect for all by expressing your own mastery of the material in your own words, diagrams, programming, etc. When you include quotations, mark and attribute them clearly and in appropriate academic style. Contact your instructor with any questions.

SCHEDULE *(subject to revision)*

CS 674 C1/EL CALENDAR FOR SPRING 2015

Lecture	Date	Topics
1	05-26	Introduction/Security Overview/Security Architecture
2	06-02	Attackers/Attacks/IS Security Architecture/
3	06-09	Operating System Security/Hardening the Database/Lab
4	06-16	User Creation and Admin/Lab/Roles and Privileges/Lab/User Access Models
5	06-23	User Access Models/Database Application Security/Exercises
6	06-30	Exercises/Virtual Private Databases - Intro, Motivation
7	07-07	Virtual Private Databases - Implementation/ Data Dictionary/Exercises
8	07-14	Exercises/Auditing
9	07-21	Auditing Cont./Triggers/Exercises
10	07-28	SQL Injection/Data Vaulting/Advanced Topics
11	08-04	Final Exam Review (Time Permitting)
12	08-11	FINAL EXAM

IMPORTANT NOTES

- We provide a virtual machine appliance for you to use during the course. This can be operated on Windows, Linux, and Macintosh OS X. The operating system internal to the virtual machine is Linux. The virtual machine is run under the free VirtualBox application, download from http://www.virtualbox.org.