

MET CS 674 02

Database Security

Online Course Syllabus

Instructor

Shengzhi Zhang, Ph.D., shengzhi@bu.edu

Course Duration

Start: March 10, 2026

End: April 27, 2026

Course credits

4 credits

Course Description

Prerequisite: MET CS 669 or proof of knowledge

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 a list of advanced topics, such as SQL injection. Database management security issues such as securing the DBMS, enforcing access controls, and related issues are also covered.

Technical Notes

The table of contents expands and contracts (+/- sign) and may conceal some pages. To avoid missing content pages, you are advised to use the next/previous page icons in the top right corner of the learning modules.

This course requires you to access files such as word documents, PDFs, and/or media files. These files may open in your browser or be downloaded as files, depending on the settings of your browser.

Course Objectives

At the completion of the course, you will fully understand how to implement database security on modern business databases by using practical scenarios and step-by-step examples. Hands-

on projects using Oracle Database Management System are used to reinforce and showcase the topics presented.

By successfully completing this course, you will be able to:

- Describe 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.
- Explain good password policies and techniques to secure passwords in your organization.
- Implement administration policies for users.
- Use Oracle to create policies, profiles and roles.
- Compare the various database security models and their advantages or disadvantages.
- Implement a Virtual Private Database using views, roles, and application context.
- Summarize an overview of auditing fundamentals and create your own auditing model.
- Describe the purpose and use of data dictionaries, encryption, and SQL injection.
- Explore an interesting topic of your choice related to database security or related topic.

Course Outline

Module 1 – Information Security Fundamentals and the Types of Attacks

- Lecture 1 – Information Security Fundamentals
- Lecture 2 – Attackers and their Attacks
- Lecture 3 – Information Security Framework

Module 2 – Operating Systems and User Administration

- Lecture 4 – Operating Systems
- Lecture 5 – User Administration

Module 3 – Profiles, Passwords, Privileges and Roles

Due to a heavy workload in this third week, it is recommended that you get started on the assignments as early as possible (particularly the Research Paper Proposal).

- Lecture 6 – Authorization
- Lecture 7 – Database Applications Security

Module 4 – Virtual Private Database

- Lecture 8 – Virtual Private Database
- Lecture 9 – How the Virtual Private Database Works

Module 5 – Auditing and Encryption with Oracle

- Lecture 10 – Auditing
- Lecture 11 – Encryption with Oracle

Module 6 – Advanced Topics (Data Dictionary and SQL Injection)

- Lecture 12 – Data Dictionary
- Lecture 13 – SQL Injection

Module 7 – Final Exam

- **Proctored Final Exam** – There will be a proctored final exam for this course.

Course Resources

Required Book

There is NO required textbook for this course.

Recommended Book



Pfleeger, C. P. & Pfleeger, S. L. (2018). *Security in Computing*.
Publisher: Pearson India

ISBN-13: 978-9352866533

ISBN-10: 9789352866533

This book can be purchased from [Barnes & Noble at Boston University](#).

Oracle Error Codes Resource

Included for your convenience is [a link of searching for standard Oracle database error messages, provided by Oracle](#).

There are more than 40,000 of these error codes, each with a code, cause, and what to do about it. For example:

ORA-12537: TNS:connection closed

Cause: “End of file” condition has been reached; partner has disconnected.

Action: None needed; this is an information message.

ORA-12538: TNS:no such protocol adapter

Cause: The protocol adapter requested (by way of the “(PROTOCOL=..)” keyword-value pair in a TNS address) is unknown. If the supplied address is typographically correct then the protocol adapter is not installed.

Action: Install the protocol adapter or correct typographical error, as appropriate. Note: if the supplied address was derived from resolving the service name, check the address in the appropriate file (TNSNAMES.ORA, LISTENER.ORA or SQLNET.ORA).

Study Guide

Module 1 Study Guide and Deliverables (March 10 – March 16)

Topics:

Information Security Fundamentals and the Types of Attacks

Readings:

- Online lectures 1–3
- Module 1 live classroom slides and recording (will be shared after the live classroom session)

Discussions:

- Discussion 1 postings end **Tuesday, March 17 at 6:00 AM ET**

Assignments:

- Assignment 1 due **Tuesday, March 17 at 6:00 AM ET**

Assessments:

- Quiz 1 due **Tuesday, March 17 at 6:00 AM ET**

Live Classroom:

- **Lecture: Tuesday, March 10 from 7:00 – 9:00 PM ET**

Module 2 Study Guide and Deliverables (March 17 – March 23)

Topics:

Operating Systems and User Administration

Readings:

- Online lectures 4 and 5
- Module 2 live classroom slides and recording (will be shared after the live classroom session)

Discussions:

- Discussion 2 postings end **Tuesday, March 24 at 6:00 AM ET**

Assignments:

- Assignment 1 due **Tuesday, March 24 at 6:00 AM ET**

Assessments:

- Quiz 2 due **Tuesday, March 24 at 6:00 AM ET**

Live Classroom:

- **Lecture: Tuesday, March 17 from 7:00 – 9:00 PM ET**

Module 3 Study Guide and Deliverables **(March 24 – March 30)**

Topics:

Profiles, Passwords, Privileges and Roles

Readings:

- Online lectures 6 and 7
- Module 3 live classroom slides and recording (will be shared after the live classroom session)

Discussions:

- *Open* Discussion

Assignments:

- Assignment 3 due **Tuesday, March 31 at 6:00 AM ET**

Assessments:

- Quiz 3 due **Tuesday, March 31 at 6:00 AM ET**

Live Classroom:

- **Lecture: Tuesday, March 24 from 7:00 – 9:00 PM ET**

Module 4 Study Guide and Deliverables **(March 31 – April 6)**

Topics:

Virtual Private Database

Readings:

- Online lectures 8 and 9
- Module 4 live classroom slides and recording (will be shared after the live classroom session)

Discussions:

- Discussion 4 postings end **Tuesday, April 7 at 6:00 AM ET**

Assignments:

- Assignment 4 due **Tuesday, April 7 at 6:00 AM ET**

Assessments:

- Quiz 4 due **Tuesday, April 7 at 6:00 AM ET**

Live Classroom:

- **Lecture: Tuesday, March 31 from 7:00 – 9:00 PM ET**

Module 5 Study Guide and Deliverables **(April 7 – April 13)**

Topics:

Auditing and Encryption with Oracle

Readings:

- Online lectures 10 and 11

- Module 5 live classroom slides and recording (will be shared after the live classroom session)

Discussions:

- Discussion 5 postings end **Tuesday, April 14 at 6:00 AM ET**

Assignments:

- Assignment 5 due **Tuesday, April 14 at 6:00 AM ET**

Assessments:

- Quiz 5 due **Tuesday, April 14 at 6:00 AM ET**

Live Classroom:

- **Lecture: Tuesday, April 7 from 7:00 – 9:00 PM ET**

Module 6 Study Guide and Deliverables (April 14– April 20)

Topics:

Advanced Topics (Data Dictionary and SQL Injection)

Readings:

- Online lectures 12 and 13

Discussions:

- Research Abstract and Findings

Assignments:

- Research Paper due **Tuesday, April 21 at 6:00 AM ET**
- Assignment 6 due **Tuesday, April 21 at 6:00 AM ET**

Assessments:

- Quiz 6 due **Tuesday, April 21 at 6:00 AM ET**

Course Evaluation:

Please complete the course evaluation once you receive an email or Blackboard notification indicating the evaluation is open. Your feedback is important to MET, as it helps us make improvements to the program and the course for future students.

Live Classroom:

- **Lecture: Tuesday, April 14 from 7:00 – 9:00 PM ET**

Final Exam Review and Course Wrap Up:

- **Saturday, April 18 from 8:00 PM – 9:00 PM ET**

Final Exam Details

The Final Exam is a proctored exam available from **Wednesday, April 22 at 6:00 AM ET to Saturday, April 25 at 11:59 PM ET**. The Computer Science department requires that all final exams be administered using an online proctoring service that you will access via your course in Blackboard. In order to take the exam, you are required to have a working webcam and computer that meets the proctoring service system requirements. A detailed list of those requirements can be found on the How to Schedule page. Additional information regarding

your proctored exam will be forthcoming from the Assessment Administrator. You will be responsible for scheduling your own appointment within the defined exam window.

Final Exam Duration: **3 hours**

The Final Exam is open book.

Student Research Presentations

The presentations linked below are samples from the classroom version of MET CS 674 and are meant to give you an idea of the scope of research topics. These are not all necessarily exceptional presentations (i.e., some are "B" grade). Also they were graded on a different rubric. Regardless, the presentations have a consistent theme – a research topic component and a "lab" component. Please note that on the bottom of most slides, narrative is documented. You have to view/print the slides in NOTES MASTER mode. In the online version of MET CS 674 you will be writing a research paper vs. creating a presentation.

- [SQL Injection Attacks with SQL 2000](#)
- [AppDetective](#)
- [XMLWebSecurity \(including Oracle\)](#)
- [WebServices and DB Security](#)
- [Data Storage Security](#)
- [Web Application Security](#)
- [Disaster Recovery](#)
- [Access Control](#)
- [Rootkits](#)
- [Secure and Monitor Mobile Databases](#)
- [SQL Server Authentication Modes](#)

Lab Assignment Instructions

Some assignments include hands-on lab exercises. Doing such labs helps to increase your understanding of the lecture material. Typically, we illustrate such concepts in a lab setting at Boston University. We are trying to replicate that approach in this course.

In your lab documents, you should include:

- Explanations of the work performed in the lab
- All SQL input and output used in the labs. You can use the SPOOL Command to save your Oracle code to a text file. This text file can then be pasted into the Word document
- Screen captures
- Websites - that you either used in completing the lab work or used as a resource
- Any other item that shows completion of the lab work

- Your submitted lab document should also include the following formatting at a minimum:
 - Your name
 - Lab title
 - Date
 - Table of contents
 - Clearly marked answers for each step in the labs
 - Page numbers in your document

An Example of Lab Submission

These submissions consist of a sentence or two describing the SQL query and a SPOOLED version of the code. For example:

I have created a new user called yourName, I used the following syntax:

```
SQL> CREATE USER yourName IDENTIFIED BY tiger01
      etc...
      8 /
      User created
```

Course Grading Structure

The course will be conducted by means of a sequence of lectures in text and graphic form. Each week will cover one or more core database security concepts and will have at least one lab component, along with a short quiz based on the topics covered that week. There is one major assignment: the Research Paper. Students will be able to demonstrate their understanding of the fundamentals of database security through these assignments. In the final module of the course there is a comprehensive final exam, and it is proctored.

Grading Policy

All students will be expected to demonstrate database security knowledge and techniques. To obtain an exceptional grade, you have to exceed expectations in your projects, quizzes, and assignments.

Grading Structure and Distribution

The grade for the course is determined by the following:

Overall Grading Percentages

Quizzes	15%
Labs/Assignment	20%
Discussions/Participation	10%

Overall Grading Percentages

Research Paper	25%
Final Examination	30%

The following grades will be assigned for your assignments.

Letter Grade Grade Point

A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C+	2.3
C	2.0
Fail	0

Grades will be curved to maintain academic standards at Boston University.

Assignments, Exams and Discussions

Participation

Graded Discussions – all discussions will be graded on a 100-point scale: [Discussion Grading Rubric](#).

Assignments

Some assignments include hands-on labs. Instructions for submitting your lab work are available by clicking the following link: [Lab Assignment Instructions](#).

Quizzes

There will be six 1-hour quizzes comprised of a combination of multiple-choice and true/false questions.

Research Paper

You are asked to research and provide a summary report on the latest security features of one of the database management systems, or a Database Security topic, as specified in the Research Paper Details.

Final Exam

There will be a proctored Final Exam in this course. The type and nature of questions in the final exam will be very similar to your quiz questions.

Expectations

Many learning activities require sharing your assignments and opinions with you classmates. For example, you may be given a set of criteria on the basis of which to evaluate other classmates' assignments, and asked to submit the results to your facilitator by a specified day of the week. It is, therefore, very important that you, as well as your classmates, submit your assignments on a timely basis. Timely submission by all will result in each of you being able to evaluate each other's assignments.

Delays

If, for any reason, you are unable to meet any assignment deadline, contact your Course Facilitator. All assignments must be completed. Extensions may be granted under mitigating circumstances.

Important Message on Final Exams

Dear Boston University Computer Science Online Student,

As part of our ongoing efforts to maintain the high academic standard of all Boston University programs, including our online MSCIS degree program, the Computer Science Department at Boston University's Metropolitan College requires that each of the online courses includes a proctored final examination.

By requiring proctored finals, we are ensuring the excellence and fairness of our program. The final exam is administered online.

Specific information regarding final-exam scheduling will be provided approximately two weeks into the course. This early notification is being given so that you will have enough time to plan for where you will take the final exam.

I know that you recognize the value of your Boston University degree and that you will support the efforts of the University to maintain the highest standards in our online degree program.

Thank you very much for your support with this important issue.

Regards,

Professor Lou Chitkushev, Ph.D.
 Associate Dean for Academic Affairs
 Boston University Metropolitan College

Discussion Grading Rubric

Graded discussion periods are held Day 1 of each module until 6:00 AM ET on Day 1 of the following module. You're certainly welcome to continue a discussion past the grading period, but that additional posted material will not affect your discussion grade. The discussion grading rubric below is the guide we use to evaluate your discussion contributions.

Discussion Grading Rubric					
Criteria	51–60	61–70	71–80	81–90	91–100
Participation	Very limited participation	Participation generally lacks frequency or relevance	Reasonably useful relevant participation during the discussion period	Frequently relevant and consistent participation throughout the discussion period	Continually relevant and consistent participation throughout the discussion period
Community	Mostly indifferent to discussion	Little effort to keep discussions going or provide help	Reasonable effort to respond thoughtfully, provide help, and/or keep discussions going	Often responds thoughtfully in a way that frequently keeps discussions going and provides help	Continually responds thoughtfully in a way that consistently keeps discussions going and provides help
Content	No useful, on-topic, or interesting information, ideas or analysis	Hardly any useful, on-topic, or interesting information, ideas or analysis	Reasonably useful, on-topic, and interesting information, ideas and/or analysis	Frequently useful, on-topic, and interesting information, ideas and analysis	Exceptionally useful, on-topic, and interesting information, ideas and analysis
Reflection and Synthesis	No significant effort to clarify, summarize or synthesize topics raised in discussions			Contributes to group's effort to clarify, summarize or synthesize	Leads group's effort to clarify, summarize or synthesize topics raised in discussions

Discussion Grading Rubric

topics raised in
discussions

Policy for the Use of Generative AI

Students should learn how to use AI text generators and other AI-based assistive resources (collectively, AI tools) to enhance rather than damage their developing abilities as writers, coders, communicators, and thinkers.

When using Generative AI in coursework, students shall:

1. Give credit to AI tools whenever used, even if only to generate ideas rather than usable text or illustrations.
2. When using AI tools on assignments, add an appendix showing (a) the entire exchange, highlighting the most relevant sections; (b) a description of precisely which AI tools were used (e.g. ChatGPT private subscription version or DALL-E free version), (c) an explanation of how the AI tools were used (e.g. to generate ideas, turns of phrase, elements of text, long stretches of text, lines of argument, pieces of evidence, maps of conceptual territory, illustrations of key concepts, etc.); (d) an account of why AI tools were used (e.g. to save time, to surmount writer's block, to stimulate thinking, to handle mounting stress, to clarify prose, to translate text, to experiment for fun, etc.).
3. Not use AI tools during in-class examinations, or assignments, unless explicitly permitted and instructed.
4. Employ AI detection tools and originality checks prior to submission, ensuring that their submitted work is not mistakenly flagged.
5. Use AI tools wisely and intelligently, aiming to deepen understanding of subject matter and to support learning.

For more details, please see the [Generative AI Assistance \(GAIA\) policy](#).

Academic Conduct Policy

Academic Integrity: Plagiarism is the passing off of another's words or ideas as your own, and it is a serious academic offense. Plagiarism and cheating also defeat the purpose of getting an education. Plagiarism and cheating cases will be handled in accordance with the disciplinary procedures described in the College of Arts and Sciences Academic Conduct Code. You are expected to know and abide by the code, which can be read online: [Academic Conduct Code](#). Penalties range from failing an assignment or course (first offense) to suspension or expulsion

from BU. If in doubt, cite your source. If you have any questions about academic integrity, please ask your instructor.

Incidents of academic misconduct will be reported to the Academic Conduct Committee (ACC). The ACC may suspend/expel students found guilty of misconduct.

Disability and Access Services

In accordance with University policy, every effort will be made to accommodate students with respect to speech, hearing, vision, or other disabilities. Any student who may need an accommodation for a documented disability should contact [Disability and Access Services](#) at 617-353-3658 or at access@bu.edu for review and approval of accommodation requests.

Once a student receives their accommodation letter, they must send it to their instructor and/or facilitator each semester. They must also send a copy to their Faculty & Student Support Administrator, who may need to update the course settings to ensure accommodations are in place. Accommodations cannot be implemented if the student does not send their letter.