Course Specification

(Postgraduate)

Course Title:	Database Security
Course Code:	CYBS60302
Program:	M.Sc. in Cybersecurity
Department:	Computer Engineering & Science
College:	Computer Science and Information Technology
Institution:	Albaha University
Version:	*Course Specification Version Number*
Last Revision Date:	*Pick Revision Date.*

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A. General information about the course:

1. Course Identification:

1. Credit hours: (3)				
2. Course type				
A.	☐University	☐College	☐Department	☐Track
B.	☐Required		☒ Elective	
3. Level/year at which this course is offered: (3/2 or 4/2)				
4. Course general Description:				
In this course, students will study principles and practices of implementing computer database security in modern businesses and industries, including database security principles, database auditing, security implementation and database reliability. Students learn to protect databases such as Oracle from attackers, design a defense in depth architecture from database environment. Review of the database management system is given at the beginning of the course.				
5. Pre-requirements for this course (if any):				
None				
6. Pre-requirements for this course (if any):				
None				
7. Course Main Objective(s):				
Upon successful completion of the course, the student will be able: - **Demonstrate understanding of current database technology and typical database products.** - **Demonstrate understanding of security architecture in modern computer systems in a typical enterprise.** - **Demonstrate the knowledge and skills for administration of user, profiles, password policies, privileges and roles.** - **Formulate a working definition of database security and administration.** - **Identify contemporary practices of operating system security.** - **Manage database security on application level.** - **Conduct database auditing for security and reliability.** - **Implement typical security projects on enterprise systems.**				

- **Communicate concepts and techniques in discussions.**

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	26	80%
2	E-learning	7	20%
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		

3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	33
2.	**Laboratory/Studio**	-
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)……**	-
	Total	33

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Demonstrate understanding of current database technology and security architecture in modern computer and administer user, profiles, password policies, privileges and roles.	K.2	• Lectures • Assignments Group Discussions	• Home work • Presentations • Midterm exam • Quiz Final Exam

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.2	Understanding the most common database security risks.	K.3	• Lectures • Assignments • Group Discussions	• Home work • Presentations • Midterm exam • Quiz Final Exam
2.0	**Skills**			
2.1	Manage database security by limiting the risks associated with misconfigured databases, rendering stolen data useless, limiting unauthorized access, and monitoring access.	S.1	• Lectures Assignments	• Midterm exam • Quiz Final Exam
2.2	Implement security protocols and techniques to overcome the Database Hacker's tool chest.	S.3	• Lectures • Labs Assignments	• Lab Exercises • Midterm exam • Quiz • Lab Exam Final Exam
3.0	**Values, autonomy, and responsibility**			
3.1	Communicate concepts and techniques in discussions.	V1	• Project (group) • Presentations Group Discussions	• Presentations Report

C. Course Content:

No	List of Topics	Contact Hours
1.	Review on Database Types(Flat, Relational, Network, Hierarchical, Object-Oriented, Object-based, Key-Value and Distributed) and Database Management system (SQL DDL, SQL DML and main database concepts)	4
2.	Overview of Data Protection: Assess database security posture and risk, Discovering sensitive data	3
3.	Authenticating database users: SQL Database Administration: User Creation and Deletion, Permissions and Access Controls	4
4.	Enforcing separation of duties	2
5.	Minimize risk from SQL Injection	4
6.	Data-driven application authorization	2
7.	Password Policies & Masking sensitive data	3
8.	Data encryption and key management	2
9.	Database auditing – reporting and alerts	4
10	Database security Architecture	3
11.	Securing the Autonomous Database	2

Total	33

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Every two weeks	5%
2.	Report, presentation, and Class Discussions	Week 9	5%
3.	Midterm Exam	Within the 6th or Week 7th	20%
4.	Quizzes	Week 10	10%
5.	Project	Week 11	10%
6.	Final Exam	Week 13	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities:

1. References and Learning Resources:

Essential References	Oracle Database Security a technical primer, Fifth edition September, 2023, Version 5.0 Copyright © 2023, Oracle and/or its affiliates Hassan A. Afyouni, Database Security and Auditing: Protecting Data Integrity and Accessibility, Thomson Course Technology (c2006)
Supportive References	
Electronic Materials	Access to the Saudi Digital Library (SDL). Using the learning management system of the university – Rafid System (https://rafid.bu.edu.sa/).
Other Learning Materials	ACM Special Interest Group on Security, Audit and Control (SIGSAC) https://www.sigsac.org/

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	A classroom or lecture hall with whiteboard for 25 students.

Items	Resources
Technology equipment (Projector, smart board, software)	□ A digital image projection system with connection to desktop computer and laptop computer. □ High speed Internet connection.
Other equipment (Depending on the nature of the specialty)	□ A high performance computer that can run Oracle database Enterprise Edition (9i, 10g or 11g) MySQL

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students - Program Leaders	Indirect
Effectiveness of students assessment	Peer reviewers	Direct
Quality of learning resources	Students	Indirect
The extent to which CLOs have been achieved	Faculty	Indirect
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	