F01/0408-4.0E	Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Cyber Security Department

Study plan No.	**2024/2025**		**University Specialization**		**Cybersecurity**	
Course No.	**0133205**		**Course name**		**Database and Security**	
Credit Hours	**3**		**Prerequisite Co-requisite**		**Applied Programming (0130231)**	
Course type	☐ MANDATORY UNIVERSITY Requirement	☐ University elective Requirement	☐ FACULTY MANDATORY Requirement	☐ Support course family requirements	☐ √**Mandatory requirement**	☐ Elective requirements
Teaching style	☐ **Full online learning**		☐ ✓Blended learning		☐ Traditional learning	
Teaching model	☐ Synchronous:1asynchronous		☐2 face to face: synchronous		☐ 3 Traditional	

Faculty member and study divisions information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	
Division number	**Time**	**Place**	**Number of students**	**Teaching style**	**Approved model**

Brief description

Database Management Systems (DBMS) describes a standard set of models, design paradigms and a Structured Query Language (SQL). In this background, the course would examine data structures, file organizations, concepts and principles of DBMS's, data analysis, database design, data modelling, database management, data & query optimization, and database implementation. More specifically, the course introduces relational data models; entity-relationship modelling, SQL, data normalization, and database design. It would also introduce query coding practices using MySQL (or any other open system) through various assignments. Design of simple multi-tier client/server architectures based and Web-based database applications will also be introduced. This course also introduces the principles, practices, procedures, and methodologies to ensure the security of data at rest within databases. This course and it appraises the convergence between database security and associated threat vectors/attack methods.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	DataBase System Concepts, 7th edition, McGraw Hill Book Company, 2020, by Abraham Silberschatz, Henry F.Korth and S.Sudarshan

Supportive learning resources (Books, databases, periodicals, software, applications, others)	1. Database Design and Relational Theory: Normal Forms and All That Jazz, 2st edition, O'Reilly Media, Inc. 2019, by C.J Date. 2. Database Systems: Design, Implementation, and Management", 13th Edition. 2019, by Carlos Coronel, Steven Morris 3. Fundamentals of Database Systems, 7th Edition, Pearson,2016, by Ramez Elmasri , Shamkant B. Navathe Galluccio, Ettore, Edoardo Caselli, and Gabriele Lombari. SQL Injection Strategies: Practical techniques to secure old vulnerabilities against modern attacks. Packt Publishing Ltd, 2020.			
Supporting websites				
The physical environment for teaching	☐ **Class room**	☐ labs	☐ **Virtual educational platform**	☐ Others
Necessary equipment and software				
Supporting people with special needs				
For technical support	**E-learning and Open Educational Center. Computer Center**			

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Course learning outcomes (S= Skills, C= Competences K= Knowledge,)

No.	Course learning outcomes	The associated program learning output code
	Knowledge	
K1	Knowledge of Database management systems - general characteristics and system structure.	**MK1**
K2	Understanding Data modelling with an emphasis on conceptual modelling.	**MK2**
K3	Defining Relational database model for database systems, database schema, and data integrity.	**MK4**
K4	Using Query languages: Relational Algebra and SQL.	**MK1**
K5	System design and programming using database systems - including database application testing and data and application security preservation	**MK5**
	Skills	
S1	Developing and accessing functional and effective conceptual models.	**MS1**
S2	Realization of relational databases.	**MS2**

S3	Developing, testing, and reviewing database applications using SQL, database APIs, and development tools.	**MS3**
S4	Ensure database security	**MS4**
S5	Developing A SQL injection attack	**MS5**
	Competences	
C1	Developing and accessing functional and effective conceptual models.	**MC1**
C2	Realization of relational databases.	**MC2**

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
First exam	0	**0**	0	0
Second / midterm exam	%30	**%30**	%30	%30
Participation / practical applications	0	**0**	0	0
Asynchronous interactive activities	%30	**%30**	%30	%30
final exam	%40	**%40**	%40	%40

Note: Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

Schedule of simultaneous / face-to-face encounters and their topics

Week	Subject	learning style*	Reference **
1	Introduction to Database systems-1		
2	Introduction to the Relational model-1		
3	Relational Operations-1		
4	Introduction to SQL-1		
5	Intermediate SQL		
6	Database Design Using the E-R model.-1		
7	Database Design Using the E-R model.-3		
8	Relational Database Design-2		
9	Relational Database Design-1		

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10	Relational Database Design-3		
11	Database security-1		
12	Database security-3		
13	Advanced database security-1		
14	Advanced database security-2		
15	Project discussion		
16	Final Exam		

*** Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.**
**** Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.**

Schedule of asynchronous interactive activities (in the case of e-learning and blended learning)

This activities was designed using the **Project-Based Learning (PBL)**

Project : Relational Database Design (PBL)

Task / Activity	Reference	Expected Results
Identify system requirements and data needs	Relational Database Design Concepts	Clear description of entities and data requirements
Create ERD and identify entities & relationships	ER Modeling, Normalization Theory	Correct ER Diagram
Normalize database to 3NF	Database Normalization Rules	Reduced redundancy & improved structure
Design relational schema (tables, PKs, FKs)	Relational Model Principles	Valid relational schema
Implement database using SQL	SQL Standards & DBMS Docs	Working database structure
Insert sample data and verify relations	SQL DML Commands	Functional relational database
Test queries and integrity constraints	Integrity Constraints Concepts	Correct and consistent data
Prepare final documentation	PBL Documentation	Complete project report