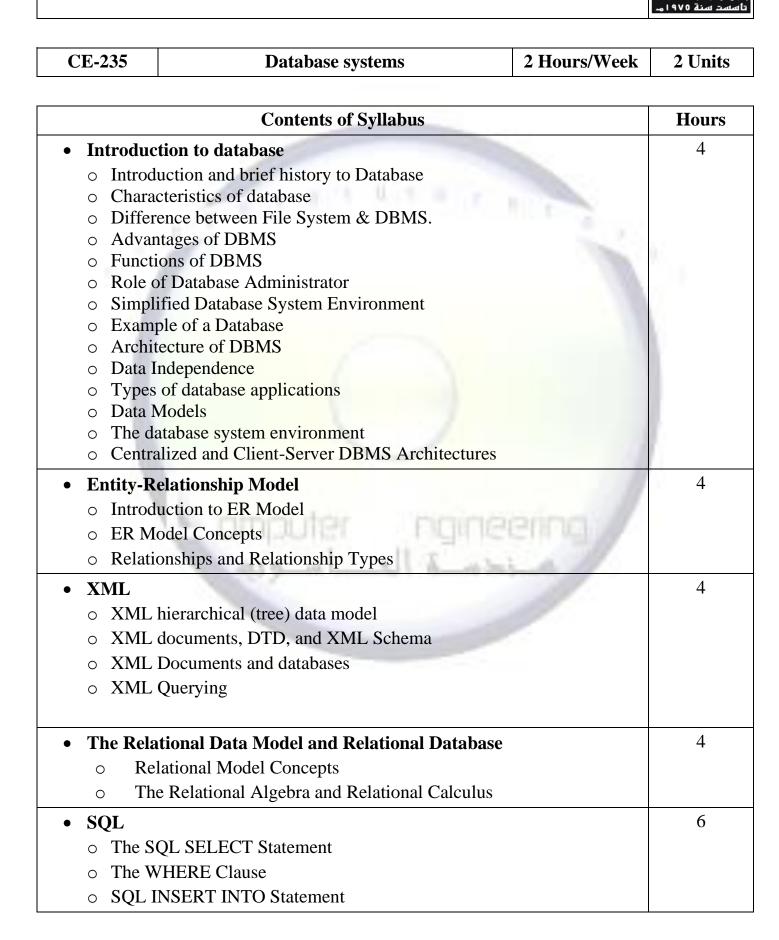| University of Technology	
University of Technology **Computer Engineering Department** **Academic Year 2023 - 2024** **Second Year – Second Semester – IT and Network Branches**	

CE-235	**Database systems**	**2 Hours/Week**	**2 Units**

Contents of Syllabus	**Hours**

• **Introduction to database**
  o Introduction and brief history to Database
  o Characteristics of database
  o Difference between File System & DBMS.
  o Advantages of DBMS
  o Functions of DBMS
  o Role of Database Administrator
  o Simplified Database System Environment
  o Example of a Database
  o Architecture of DBMS
  o Data Independence
  o Types of database applications
  o Data Models
  o The database system environment
  o Centralized and Client-Server DBMS Architectures
	4

• **Entity-Relationship Model**
  o Introduction to ER Model
  o ER Model Concepts
  o Relationships and Relationship Types
	4

• **XML**
  o XML hierarchical (tree) data model
  o XML documents, DTD, and XML Schema
  o XML Documents and databases
  o XML Querying
	4

• **The Relational Data Model and Relational Database**
  o Relational Model Concepts
  o The Relational Algebra and Relational Calculus
	4

• **SQL**
  o The SQL SELECT Statement
  o The WHERE Clause
  o SQL INSERT INTO Statement
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o SQL UPDATE Statement o SQL DELETE Statement o SQL TOP Clause o SQL LIKE Operator o SQL Joins o SQL UNION Operator o SQL SELECT INTO Statement o SQL CREATE DATABASE Statement o SQL Constraints o SQL ALTER TABLE Statement o SQL Views o SQL Date Functions	
• **Database design** o Informal Design Guidelines for Relation Schemas o Functional Dependencies o Normal Forms Based on Primary Keys o General Definitions of Second and Third Normal Forms o Boyce-Codd Normal Form. o Fourth Normal Form o Fifth Normal Form	6
• **Transaction Management** o Introduction to transaction processing o Transaction and system concepts o Desirable properties of transactions o Transaction support in SQL	4

References

• Fundamentals of Database Systems, 5th edition, Ramez Elmasri and Shamkant B. Navathe, 2007.

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