MODULE DESCRIPTION FORM

Module Information					
Module Title	**Principles of Database Systems**			**Module Delivery**	
Module Type	**Core**			☒ **Lecture** ☒ **Practical**	
Module Code	**IT2103**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UG2		**Semester of Delivery**	1	
Administering Department	Information Technology		**College**	College of Science	
Module Leader	Hussein Zaki Jassim		**e-mail**	hussein.almngoshi@uowa.edu.iq	
Module Leader's Acad. Title	Asst. Lecturer		**Module Leader's Qualification**	Ph.D.	
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Scientific Committee Approval Date	2024-09-17		**Version Number**	V1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	None
Co-requisites module	None	**Semester**	None

Department Head Approval **Dean of the College Approval**

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. Provide a solid understanding of database concepts, principles, and best practices. 2. Familiarize students with the design, implementation, and management of databases. 3. Cover topics such as data modeling, normalization, and query optimization. 4. Develop practical skills in using database management systems and query languages. 5. Cultivate critical thinking and problem-solving abilities in the context of database design and administration. 6. Prepare students to apply their knowledge in real-world scenarios. 7. Equip students to contribute to effective database solutions in the IT industry.
Module Learning Outcomes	1. Understand the fundamental concepts and principles of databases, including data models, schemas, and normalization. 2. Demonstrate proficiency in designing, implementing, and managing databases using a database management system (DBMS). 3. Apply data modeling techniques to develop logical and physical database designs that meet specified requirements. 4. Construct and execute complex SQL queries to retrieve, update, and manipulate data stored in a database. 5. Evaluate and optimize query performance through the use of indexing, query tuning, and other optimization techniques. 6. Implement and enforce data integrity constraints, including entity relationships, referential integrity, and data validation rules. 7. Employ appropriate security measures to protect data and ensure database confidentiality, integrity, and availability. 8. Utilize backup and recovery procedures to safeguard data and restore databases in the event of failures or disasters.
Indicative Contents	Indicative content includes the following. 1. Introduction: Briefly explain the purpose and goals of the database. Provide an overview of its intended users and stakeholders. Outline the benefits and value the database brings to the organization. 2. Database Design: Describe the overall structure and organization of the database.

	Identify the key entities, attributes, and relationships within the database. Explain the normalization process employed to ensure data integrity and eliminate redundancy. Discuss any design considerations specific to the database, such as performance optimization or scalability. 3. Data Model: Present the conceptual, logical, and physical data models used in the database. Explain the entity-relationship (ER) diagram, tables, and schema design. Discuss the various data types, constraints, and indexes used in the database. Highlight any additional modeling techniques or methodologies applied. 4. Functionality and Features: Enumerate the main functions and features provided by the database. Outline the CRUD operations (Create, Read, Update, Delete) supported. Describe any specialized or advanced features, such as data validation, triggers, or stored procedures. Mention any security measures implemented, such as user authentication and access control. 5. Data Sources and Integration: Identify the sources of data that feed into the database. Explain any data integration processes, including extraction, transformation, and loading (ETL). Discuss any data quality or cleansing procedures employed to ensure data accuracy. 6. Performance and Scalability: Discuss the database's performance characteristics, including response times and throughput. Describe any performance tuning techniques used, such as indexing or query optimization. Explain how the database handles scalability and growth, including considerations for increasing data volume or user load. 7. Maintenance and Administration: Outline the procedures for database backup, recovery, and disaster management. Explain the ongoing maintenance tasks, such as data archiving or purging. Describe the roles and responsibilities of database administrators. Mention any monitoring and alerting mechanisms in place.

Learning and Teaching Strategies	
Strategies	The learning and teaching strategies for sudying the database subject in an IT department involve a balanced approach of theoretical understanding and practical application. Lectures, interactive discussions, and case studies provide the necessary theoretical foundation. Practical exercises, group work, and projects enable hands-on experience with database management systems. Workshops, demos, and industry examples offer real-world insights. Online resources, assessments, and feedback aid in reinforcing learning. Virtual labs and continuous learning emphasize practical skills

	development and staying updated with industry trends. These strategies ensure a comprehensive understanding of databases and their relevance in the IT field.

Student Workload (SWL)

Structured SWL (h/sem	60	**Structured SWL (h/w)**	4
Unstructured SWL (h/se	87	**Unstructured SWL (h/w)**	6
Total SWL (h/sem)	147 + 3 final = 150		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	5	10% (8)	2,4,6,8,10	1,2,3,4,5,6,7
	OnSite Assignments	5	10% (5)	2,4,7,9,12	3,5,8
	Projects.	1	10% (7)	12	All
	Lab	5	10% (15)	3,5,7,9,11	All
	Home Work	5	10%(5)	2,5,8,9,12	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to databases: concepts, importance, and applications Relational database management systems (RDBMS)

Week 2	Overview: Introduction to Structured Query Language (SQL)
Week 3	Database design principles and data models
Week 4	Entity-Relationship (ER) modeling and ER diagrams
Week 5	Database constraints: primary key, foreign key
Week 6	Database constraints unique, and check constraints
Week 7	Database administration and security: user management, permissions, and access control
Week 8	Backup and recovery strategies for databases
Week 9	Indexing and query optimization techniques
Week 10	Transaction management and concurrency control in databases
Week 11	Relational model and relational calculus
Week 12	Relational model and relational algebra
Week 13	Transaction management and concurrency control in databases
Week 14	Transaction management and concurrency control in databases
Week 15	Database performance monitoring.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Sy	
	Material Covered
Week 1	Lab 1: Setting up the database environment
Week 2	Lab 2: practicing basic SQL queries
Week 3	Lab 3: Designing an ER diagram for a given scenario
Week 4	Lab 4: translating ERD into a relational schema
Week 5	Lab 5: Normalizing a sample dataset and implementing the normalized tables in the database
Week 6	Lab 6: Learn all types of data used in database systems
Week 7	Lab 7: Learn to create a database with all specifications
Week 8	Lab 8: Learn to create tables with the ability to modify fields
Week 9	Lab 9: Learn addition operations for constraints in tables with constraints
Week 10	Lab 10: Learn operations for updates to constraints in tables with constraints
Week 11	Lab 11: Learn delete operations for constraints in tables with constraints
Week 12	Lab 12: Learn to build procedures for adding and modifying data

Week 13	Lab 13: Learn to build procedures with input variables
Week 14	Lab 14: Learn to construct procedures with output variables
Week 15	Lab 15: Implementation of an integrated database management project for each student

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Elmasri, Ramez, and Shamkant Navathe. Fundamentals of database systems. AddisonWesley Publishing Company, 2018.	Yes
Recommended Texts	Database design, application and development.	No
Websites	http://www.sqlcourse.com/	

Grading Scheme

Group	Grade	Mark	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	Excellent	90 - 100	Outstanding Performance
	B - Very Good	Very Good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Fair / Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Pass / Acceptable	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	Fail (Pending)	(45-49)	More work required but credit awarded
	F – Fail	Fail	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.