MODULE DESCRIPTOR FORM

Module Information				
Module Title	**DBMS ADMINISTRATION**		**Module Delivery**	
Module Type	**CORE**		☒ **Lecture** ☒ **Practical**	
Module Code	**IT3103**			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Module Level		**Semester of Delivery**		
Administering Department	Information Technology	**College**	College of Sciences	
Module Leader	**Mahmood Jasim**	**e-mail**	mahmood.jasim@uowa.edu.iq	
Module Leader's Acad. Title	Lec. Dr	**Module Leader's Qualification**	Ph.D	
Module Tutor		**e-mail**		
Peer Reviewer name		**e-mail**		
Review Committee Approval		**Version Number**		

Relation With Other Modules			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

جامعة وارث الانبياء
كلية العلوم
قسم تكنولوجيا المعلومات

Department Head Approval

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عمادة كلية العلوم

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 modelling, 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. Database Design: This includes creating and maintaining the logical and physical structure of databases. It involves defining tables, relationships, constraints, and indexes to ensure efficient data storage and retrieval. 2. Data Modeling: Database administrators (DBAs) are responsible for developing data models that represent the organization's data requirements. This involves identifying entities, attributes, and relationships to create a conceptual

	and logical representation of the data. 3. Performance Tuning: DBAs monitor database performance and optimize it for efficient data access and processing. They analyze query execution plans, identify bottlenecks, and make necessary adjustments to improve performance, such as optimizing queries, configuring indexes, or adjusting database parameters. 4. Backup and Recovery: DBAs implement strategies to ensure data integrity and availability. This includes designing and implementing backup and recovery plans, scheduling regular backups, and performing data restores when necessary. 5. Security Management: DBAs are responsible for safeguarding the database and its contents from unauthorized access, data breaches, or other security threats. They set up user access controls, define security policies, and implement encryption and other security measures to protect sensitive data. 6. Database Maintenance: DBAs perform routine maintenance tasks to ensure the ongoing health and stability of the database system. This includes monitoring database performance, applying software patches and upgrades, managing storage space, and resolving any issues that may arise.

Learning and Teaching Strategies	
Strategies	Learning and teaching strategies for advanced Distributed Database Administration (DDB DBA) involve a combination of theoretical knowledge and practical experience. Instructors can utilize lectures, case studies, discussions, and group activities to explore the complexities of distributed databases, covering topics such as data fragmentation, replication, and concurrency control. Real-world examples and industry best practices should be incorporated to illustrate challenges and solutions. Practical exercises and projects should be emphasized, allowing students to apply their knowledge in designing and implementing distributed database systems. These exercises may include setting up distributed database environments, configuring replication mechanisms, and troubleshooting common issues. By employing a blended approach of theory and hands-on practice, advanced DDB DBA learners can develop the necessary skills and knowledge to effectively manage complex distributed database systems.

Student Workload (SWL)			
Structured SWL (h/sem)	60	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	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	8 (10%)	2,4,6,8,10	1,2,3,4,5,6,7
	Project	1	7 (10%)	12	all
	Lab	5	15 (10%)	3,5,7,9,11	all
	Homework	5	5 (10%)	2,5,8,9,12	all
	Assignments	5	5 (10%)	3,5,8,10,11	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 Distributed Database
Week 2	Examples of DBMS Application Areas
Week 3	Types of DBMS
Week 4	Factors Encouraging DDBMS
Week 5	Advantages of Distributed Databases
Week 6	Distributed Database Vs Centralized Database
Week 7	Homogeneous Distributed Databases
Week 8	Heterogeneous Distributed Databases
Week 9	Client - Server Architecture for DDBMS
Week 10	Peer - to - Peer Architecture for DDBMS
Week 11	Multi - DBMS Architecture
Week 12	Data Fragmentation
Week 13	Data Replication and Allocation
Week 14	QUERIES AND OPTIMIZATION
Week 15	CAP Theorem for Data Engineering
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Setting up the development environment for distributed database projects
Week 2	Implementing data fragmentation strategies in a distributed database
Week 3	Configuring replication and synchronization in a distributed database environment
Week 4	Implementing concurrency control mechanisms in a distributed database system
Week 5	Analyzing and optimizing query plans in a distributed database environment
Week 6	Implementing distributed data storage and indexing strategies
Week 7	Designing and implementing fault-tolerant mechanisms in a distributed database system
Week 8	Configuring security measures and access controls in a distributed database environment
Week 9	Implementing data warehousing and OLAP operations in a distributed database system
Week 10	Exploring Big Data technologies and implementing NoSQL databases in a distributed environment
Week 11	Deploying and scaling distributed databases in a cloud environment
Week 12	Analyzing performance bottlenecks and optimizing distributed database performance
Week 13	Implementing stream processing and real-time analytics in a distributed database system
Week 14	Final project showcase and evaluation
Week 15	Implementation of an integrated database management project for each student

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	1. Distributed database systems vera goebel 2. Distributed database management systems a practical approach	Yes
Recommended Texts	1. Distributed Database Systems 2. Distributed Systems 3. Principles of Distributed Database Systems 4. Distributed Database 5. Management Systems	No
Websites	https://www.tutorialspoint.com/distributed_dbms/distributed_dbms_databases.htm What is a distributed database? | Definition from TechTarget Principles of Distributed Database Systems | SpringerLink	

APPENDIX:

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:				

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.