	Ministry of Higher Education and Scientific Research. University of Anbar. Department of Information System.	

MODULE DESCRIPTOR FORM

Module Information					
Module Title	Design and Analysis of Databases			**Module Type**	TYPE B
Module Code		ISDC205	**ECTS Credits**		6
Module Level		UGII	**Semester of Delivery**		Four
Administering Department		IS	**Faculty**	CSIT	
Module Leader	Sadir A. Fadhil		**e-mail**	fadhil-academia@uoanbar.edu.iq	
Module Leader's Acad. Title		Lecturer Asst.	**Module Leader's Qualification**		MSc
Module Tutor			**e-mail**		
Peer Reviewer Name		/	**e-mail**	/	
Review Committee Approval		DD/MM/YY	**Version Number**	2.0	

Relation With Other Modules	
Pre-requisites	
Co-requisites	
Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	The module "Design and Analysis of Databases" in the Computer Science department aims to provide students with a comprehensive understanding of the principles and techniques involved in designing, analyzing, and managing databases. The module focuses on both theoretical concepts and practical skills required for efficient and effective database design. The main objectives of the module may include: Understanding Database Fundamentals: Students will learn the fundamental concepts of databases, including data models, schemas, keys, relationships, and normalization. They will gain knowledge of different types of databases such as

	relational, hierarchical, and object-oriented databases. Database Design: The module will cover the process of designing databases, including entity-relationship modeling, schema design, and the use of modeling tools. Students will learn how to translate real-world requirements into a well-structured and efficient database design. Querying and Manipulating Databases: Students will acquire skills in writing SQL (Structured Query Language) queries to retrieve, update, and manipulate data stored in a database. They will understand the importance of efficient query design and optimization techniques.
Module Learning Outcomes	Upon completion of the module "Design and Analysis of Databases" in the Computer Science department, students can expect to achieve several learning outcomes. These outcomes are designed to demonstrate their understanding of database design principles, proficiency in using database management systems, and ability to analyze and optimize databases. The specific outcomes may include: Knowledge of Database Concepts: Students will have a solid understanding of fundamental database concepts, including data models, schemas, keys, relationships, normalization, and different types of databases. Database Design Skills: Students will be able to apply entity-relationship modeling techniques and other design methodologies to create well-structured and efficient database schemas. They will understand the importance of normalization and be able to transform real-world requirements into a database design. Proficiency in SQL: Students will have practical skills in writing SQL queries to retrieve, update, and manipulate data stored in databases. They will understand the syntax and semantics of SQL and be able to use it effectively to work with relational databases. Database Management: Students will be familiar with popular database management systems (DBMS) and have hands-on experience in using them. They will understand the architecture, features, and functionalities of DBMS and be able to create and manage databases within those systems.
Indicative Contents	
Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module are: 1. Power point presentation (Data show). 2. Explanation on the white board using different color markers. 3. Discussions with the student during teaching. 4. Interaction with students through daily problems practice through lecture. 5. Solve different problems with more exercises. 6. Submit assignment that develop student learning.

Module Delivery	
Structured workload (h/w)	4.4
Unstructured workload (h/w)	5.6
Total workload (h/w)	10

Module Evaluation				
	Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Quizzes	3	6% (6)	3,7 and 11	
Assignments	2	6% (6)	2 and 12	
Projects / Lab.	1	15% (15)	Continuous	
Report	1	5% (5)	13	
Midterm Exam	2 hr	18% (18)	7	
Final Exam	3 hr	50% (50)	16	
Total		100% (100 Marks)		

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts		Yes/No
Recommended Texts		Yes/No
Websites		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Week 1: Introduction to Databases Overview of databases and their importance Types of databases: relational, hierarchical, object-oriented, etc. Introduction to the role of database management systems (DBMS)

Week 2	Week 2: Data Modeling and Entity-Relationship (ER) Modeling Data modeling concepts Entity-Relationship (ER) modeling and ER diagrams Cardinality and relationships in ER diagrams
Week 3	Week 3: Relational Database Design Relational database concepts Functional dependencies and normalization (1NF, 2NF, 3NF) Database schema design using normalization
Week 4	Week 4: Advanced Relational Database Design Beyond 3NF: Boyce-Codd Normal Form (BCNF) and Fourth Normal Form (4NF) Denormalization and trade-offs in design decisions Practical considerations in relational database design
Week 5	Week 5: Structured Query Language (SQL) Basics Introduction to SQL and its role in database querying Basic SQL syntax: SELECT, INSERT, UPDATE, DELETE statements Filtering and sorting data using WHERE and ORDER BY clauses
Week 6	Week 6: Advanced SQL Queries Joins and subqueries in SQL Aggregation functions: SUM, AVG, COUNT, etc. Working with views and stored procedures
Week 7	Mid-Term Exam
Week 8	Week 7: Database Management Systems (DBMS) Introduction to popular DBMS (e.g., Oracle, MySQL, Microsoft SQL Server) DBMS architecture and components Database creation, management, and administration tasks
Week 9	Week 8: Ensuring Data Integrity and Security Enforcing data integrity constraints (primary keys, foreign keys, check constraints) Access control and user management Database security measures: authentication, authorization, encryption
Week 10	Week 9: Query Optimization and Performance Tuning Importance of query optimization for efficient database performance Indexing and its impact on query execution Techniques for database performance tuning

Week 11	Week 10: NoSQL Databases and Big Data Processing Introduction to NoSQL databases: key-value, document, columnar, and graph databases Overview of Big Data processing technologies Comparison of SQL and NoSQL databases
Week 12	Week 11: Distributed Databases and Replication Distributed database concepts Replication techniques and data consistency Scalability and fault-tolerance considerations in distributed databases
Week 13	Week 12: Emerging Trends and Future Directions Overview of emerging trends in database technologies Discussion of current research and industry developments Recapitulation and review of key concepts
Week 14	Week 12: Emerging Trends and Future Directions Overview of emerging trends in database technologies Discussion of current research and industry developments Recapitulation and review of key concepts
Week 15	**Preparatory Week**
Week 16	**Final Exam**

APPENDIX:

UNIVERSITY of Anbar				
GRADING SCHEME				
Group	**ECTS Grade**	**% of Students/Marks**	**Definition**	**GPA**
Success Group (50 - 100)	**A** - Excellent	Best 10%	Outstanding Performance	**5**
	B - Very Good	Next 25%	Above average with some errors	**4**
	C - Good	Next 30%	Sound work with notable errors	**3**
	D - Satisfactory	Next 25%	Fair but with major shortcomings	**2**
	E - Sufficient	Next 10%	Work meets minimum criteria	**1**
Fail Group (0 – 49)	**FX** – Fail	(45-49)	More work required but credit awarded	
	F – Fail	(0-44)	Considerable amount of work required	
Note:				

NB 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.