Faculty: Information Technology	
Department: Computer Science Program: Bachelor	
Academic year: Semester:	

Course Plan

First: Course Information

Course No.: 1501434	Course Title: Database Management Systems	Credit Hours: 3	Theoretical: 3	Practical: 0
Prerequisite No. and Title: 1501222 Database System		Section No.:	Lecture Time: --	
Level in JNQF	7			
Type Of Course:	☐ Obligatory University Requirement ☐ Elective University Requirement ☐ Obligatory Faculty Requirement ☐ Elective Faculty Requirement ☐ Obligatory Specialization Requirement ■ Elective Specialization Requirement ☐ Ancillary course			
Type of Learning:	☐ Face-to-Face Learning ■ Blended Learning (2 Face-to-Face + 1 Asynchronous) ☐ Online Learning (2 Synchronous+ 1 Asynchronous)			

Second: Instructor's Information

Course Coordinator:		
Name:	Academic Rank:	
Office Number:	Extension Number:	Email:
Course Instructor:		
Name:	Academic Rank:	
Office Number:	Extension Number:	Email:
Office Hours:	Sunday Monday Tuesday Wednesday Thursday	

Third: Course Description

This course aims to provide students with the principles of managing database systems, covering concepts such as integrity control, transactions, and concurrency control. Upon completion of the course, students are expected to: Ensure that the database remains in a consistent state despite concurrent access by multiple transactions. Demonstrate awareness of transaction operations. Manage recovery concepts and understand how to restore the database to a safe state. Apply various deadlock resolution strategies to optimize concurrency.

Fourth: Course Objectives

1. Introducing the student to the concepts of Database Management Systems, including Concurrency Control, Transactions, Recovery, and Deadlock Management.
2. Ensure that the database remains in a consistent state despite concurrent access by multiple transactions.
3. Implement mechanisms to detect and resolve deadlocks, situations where two or more transactions are blocked indefinitely, each waiting for the other to release a lock.
4. Ensure that committed transactions are durable and survive system failures. The changes made by committed transactions should be permanent and recoverable.
5. Providing the student with the skills of running the transaction as atomic, consistence, isolated, and durable.

Fifth: Learning Outcomes

Level descriptor according to (JNQF)	CILOs Code	CILOs If any CLO will not be assessed in the course, mark NA.	Associated PILOs Code *Choose one PILO for each CILO**	Assessment method *Choose at least two methods*
Knowledge	**K1**	List the basic terminologies of a database management system, and Explain transaction management concepts, and concurrency management concepts.	**PK1**	• Quizzes • Mid-term Exam • Final Exam
	K2	Describe the database problems in absence of concurrency Control. And Identify recovery techniques. And the awareness of database instability.	**PK3**	• Quizzes • Mid-term Exam • Final Exam
Skills	**S1**	Examine transaction management concepts, including isolation levels, atomic and consistent transactions.	**PS2**	• Mid-term Exam • Quizzes • Final Exam
	S2	Analyze concurrent access to the database, and choose techniques such as locking, timestamping to resolve deadlocks. And apply the strategies for database recovery, including backup and restore procedures.	**PS3**	• Quizzes • Mid-term Exam • Final Exam
Competencies	**C1**	Group presentation and discussion on advance topic in database management systems.	**PC1**	• Presentation

*CILOs: Course Intended Learning Outcomes; PILOs: Program Intended Learning Outcomes; For each CILO, the PILO could be the same or different.

Sixth: Learning Resources

Main Reference:	Fundamentals of Database Systems.			
Author: Elmasri R. and Navathe S B.	Issue No.: 7ed.	Print:		Publication Year: 2015
Additional Sources and Websites:	• Silberschatz, Korth and Sudarshan, "Database System Concepts", McGraw Hill, 2010. • Tanner Özsu and Patrick Valduriez, "Principles of Distributed Database Systems". 3rd Edition. 2011.			
Teaching Type:	■ Classroom ☐ Laboratory ☐ Workshop ■ MS Teams ■ Moodle			

Seventh: Course Structure

Week	Course Intended Teaching Outcomes (CILOs)	Topics	Teaching Procedures*	Teaching Methods**	References***
1	K1	Introduction to Database Systems (an overview)	Face-to-Face	Lecture	Chapter 1
		Introduction to Database Management Systems (DBMS).	Asynchronous	Reading Material Video	
2	K1	Transaction Processing Concepts and Theory.	Face-to-Face	Lecture	Chapter 21
		Introduction to transaction processing.			
		DBMS	Asynchronous	Quiz	Chapter 1
3	K1, S1	Single-User versus Multi-user Systems	Face-to-Face	Lecture	Chapter 1
		Parallel versus interleaving, Read and Write operations			
		Transaction Processing.	Asynchronous	Reading Material Video	Chapter 21

		Transaction and System Concepts. Transaction States and Additional operations. The System Log Commit Point of a Transaction Schedules Based on Recoverability.	Face-to-Face	Lecture	Chapter 21
4	K1, S1	Transaction Basic Operation.	Asynchronous	Reading Material Video	
5	K1, S1	Transaction and System Concepts. Transaction States and Additional operations. The System Log Commit Point of a Transaction Schedules Based on Recoverability.	Face-to-Face	Lecture	Chapter 21
		Step for Read and Write Operations	Asynchronous	Video	
6	K1, S1	Characterizing Schedules based on Serializability. Conflict Serializable. Schedules Testing for Conflict Serializability of a Schedule.	Face-to-Face	Lecture	Chapter 21
7	K2, S2	Concurrency Control Techniques Two-phase Locking Techniques for Concurrency Control. Types of Locks and System Lock Tables.	Face-to-Face	Lecture	Chapter 22
		Serializability and Recoverability.	Asynchronous	Video	
Midterm Exams					
8	K2, S2	Concurrency Control Techniques Two-phase Locking Techniques for Concurrency Control. Types of Locks and System Lock Tables.	Face-to-Face	Lecture	Chapter 22
		Testing deadlock by Wait-for graphs	Asynchronous	Video	
9	K2, S2	Guaranteeing Serializability by Two- Phase Locking. Guaranteeing Serializability by Two-Phase Locking variants. Guaranteeing Serializability by Two- Phase Locking. Guaranteeing Serializability by Two-Phase Locking variants.	Face-to-Face	Lecture	Chapter 22
		The Basic Timestamp Ordering Algorithm	Asynchronous	Video	
10	K2, S2	Wound-Wait and Wait-Die protocols. Testing deadlock by Wait-for graphs.	Face-to-Face	Lecture	Chapter 22
		2 PL protocol.	Asynchronous	Quiz and Reading Material	

11	K2, S2	The Basic Timestamp Ordering Algorithm. Granularity of Data Items and Multiple Granularity Locking Examples of Multiple Granularity Locking.	Face-to-Face	Lecture	Chapter 22
		Database Recovery Techniques	Asynchronous	Assignment and Video	Chapter 22
12	K2, S2	Database Recovery overview.	Face-to-Face	Lecture	Chapter 23
		Database Recovery Techniques.			
		Immediate database Modifications Deferred and Immediate Techniques	Asynchronous	Video	
13	K2, S2	Database Recovery Techniques.	Face-to-Face	Lecture	Chapter 23
			Asynchronous	Quiz and Reading Material	
14	S1, S2	Concurrency and Recovery revision.	Face-to-Face	Lecture	Chapter 22, 23
		Transaction, Concurrency and Recovery revision.	Asynchronous	Revision	
Final Exams					

*Teaching procedures: (Face-to-Face, synchronous, asynchronous).　　　** Teaching methods: (Lecture, video….).
*** Reference: (Pages of the book, recorded lecture, video….)

Eighth: Assessment Methods

Methods	Online Learning	Blended Learning	Face-To-Face Learning	Specific Course Output to be assessed **If any CILO will not be assessed in the course, mark NA.				
				K1	K2	S1	S2	C1
First Exam								
Second Exam								
Mid-term Exam		30		✓	✓	✓	✓	
Participation								
Asynchronous Activities								
Quizzes		15		✓	✓	✓	✓	
Assignments								
Group presentation		5						✓
Final Exam		50		✓	✓	✓	✓	
Total out of 100		100						

Ninth: Course Policies

- All course policies are applied to all teaching patterns (online, blended, and face-to-face Learning) as follows:
  a. Punctuality.
  b. Participation and interaction.
  c. Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).

Approval	Name	Date	Signature
Head of Department			
Faculty Dean			