Detailed Course Description - Course Plan Development and Updating Procedures/ Computer Science Department	QF01/0408-3.0E

Faculty	Faculty of Science and Information Technology	Department	Computer Science
Course number	**0112352**	Course title	Database(2)
Number of credit hours	3	Pre-requisite/co-requisite	Database(1)

Brief course description:
This course provides an advanced concepts related to database; transactions and their ACID properties; concurrency control; recovery system; database-system architecture; parallel databases; distributed databases; data analysis, data warehousing, OLAP, and data mining.

	Course goals and learning outcomes
Goal 1	The ability to identify and explain the concepts and importance of advanced databases and their applications
Learning outcomes	1.1 The student should know the basic concepts underlying the advanced databases and their applications 1.2 The student should explain the importance of advanced databases and their applications
Goal 2	The ability to recognize transactions, their properties, states, and problems resulting from data sharing
Learning outcomes	2.1 The student should recognize the transactions, their properties (ACID), and their states 2.2 The student should explain the problems caused by data sharing in case of not using concurrent control 2.3 The student should recognize the serializable and recoverable schedules 2.4 The student should classify and compare the various locks used in concurrent control 2.5 The student should determine the deadlock, the two phase locking, and analyze the effect of timestamp on the order of transactions and concurrent control
Goal 3	The ability to recover databases and prevent their data loss
Learning outcomes	3.1 The student should recognize the types of failures and their impact on the loss of data in the databases 3.2 The student should recognize the concepts of recovery, such as log-based recovery (Immediate and Deferred), and techniques of Shadow Paging
Goal 4	The ability to understand server /used architecture, distributed databases, and parallel databases
Learning outcomes	4.1 The student should recognize the structure of the distributed databases, their benefits and distribution methods, and their data distribution methods 4.2 The student should recognize the structure of the distributed database systems design, and identify the classification of the distributed database environment 4.3 The student should recognize the structure of the parallel databases and recognize a variety of parallelization techniques
Goal 5	The ability to identify data warehousing concepts, data mining, online analytical processing (OLAP), and how to retrieve information
Learning	5.1 The student should be familiar with the data warehousing, data mining and

outcomes	online analytical processing (OLAP) 4.2 The student should learn how to retrieve information (information retrieval)
Textbook	**1. Database Systems: Design, Implementation, and Management**, 12th edition, Course Technology, 2016, by Carlos Coronel, Steven Morris. **ISBN-13: 978-1305866799, ISBN-10: 1305866797**
Supplementary references	**1. Database System Concepts**, 6th edition, McGraw Hill, 2010, by Abraham Silberschatz, Henry F. Korth, and S.Sudarshan. **ISBN: 0-07-352332-1** **2. Database Systems: A practical Approach to Design, Implementation, and Management**, 5th edition, Addison-Wesley Publication Company, 2010, by Thomas M. Connolly and Carolyn E. Begg. **ISBN-13: 978-0-321-52306-8, ISBN-10:0-321-52306-7** **3. Database Systems: Models, Languages, Design, and Application Programming**, 6th ed, Pearson Inc., 2011, by Ramez A. Elmasri, Shamkant Navathe. **ISBN-13: 978-0-13-214498-8, ISBN-10: 0-13-214498-0** **4. Concepts of Database Management**, 7th edition, Course Technology, 2012, by Philip J. Pratt, Joseph J. Adamski. **ISBN-13: 978-1-111-82591-1, ISBN-10: 1-111-82591-2**

Course timeline				
Week	**Number of hours**	**Course topics**	**Pages (textbook)**	**Notes**
01	**1** **1** **1**	**Transaction** – Transaction Concept – A Simple Transaction Model – Storage Structure	Ch14: 627-652	**Ref 1**
02	**1** **1** **1**	**Transaction (*Cont.*)** – Transaction Atomicity and Durability – Transaction Isolation – Serializability	Ch14: 627-652	**Ref 1**
03	**1** **1** **1**	**Transaction (*Cont.*)** – Recoverability – Transaction Isolation and Atomicity – Transaction Isolation Levels – Implementation of Isolation Levels	Ch14: 627-652	**Ref 1**
04	**1** **1** **1**	**Concurrency Control** – Lock-Based Protocols –	Ch15: 661-703	**Ref 1**
05	**1** **1** **1**	**Concurrency Control (*Cont.*)** – Deadlock Handling – Multiple Granularity	Ch15: 661-703	**Ref 1**
06	**1** **1** **1**	**Concurrency Control (*Cont.*)** – Multiple Granularity – Weak Levels of Consistency in Practice	Ch15: 661-703	**Ref 1**

07	**1** **1** **1**	**Revision** **First Exam 20%**		
08	**1** **1** **1**	**Recovery System** – Failure Classification – Storage – Recovery and Atomicity – Recovery Algorithm	Ch16: 721-765	**Ref 1**
09	**1** **1** **1**	**Database-System Architectures** – Centralized and Client–Server Architectures – Server System Architectures – Parallel Systems – Distributed Systems – Network Types	Ch17: 769-793	**Ref 1**
10	**1** **1** **1**	**Parallel Databases** – Introduction – I/O Parallelism – Interquery Parallelism – Intraquery Parallelism	Ch18: 797-817	**Ref 1**
11	**1** **1** **1**	**Parallel Databases (*Cont.*)** – Intraoperation Parallelism – Interoperation Parallelism **Revision**	Ch18: 797-817	**Ref 1**
12	**1** **1** **1**	**Distributed Database** – Homogeneous and Heterogeneous Databases – Distributed Data Storage – Distributed Transactions – Commit Protocols	Ch19: 825-874	**Ref 1**
13	**1** **1** **1**	**Distributed Database (*Cont.*)** – Concurrency Control in Distributed Databases – Distributed Query Processing – Heterogeneous Distributed Databases **Second Exam 20%**	Ch19: 825-874	**Ref 1**
14	**1** **1** **1**	**Data Warehousing and Mining** – Decision-Support Systems – Data Warehousing – Data Mining – Classification – Association Rules – Other Types of Associations	Ch20: 887-910	**Ref 1**

15	**1 1 1**	**Information Retrieval** – Relevance Ranking Using Terms – Relevance Using Hyperlinks – Synonyms, Homonyms, and Ontologies	Ch21: 915-926	**Ref 1**
16	**1 1 1**	**Revision** **Final Exam 50%**		

Theoretical course evaluation methods and weight	Participation = 10% First exam 20% Second exam 20% Final exam 50%	**Practical (clinical) course evaluation methods**	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%

Approved by head of department		**Date of approval**	

Extra information (to be updated every semester by corresponding faculty member)

Name of teacher	Fadel "Moh'd Kamel" Altamimi	Office Number	
Phone number (extension)		Email	dr.fadel@zuj.edu.jo
Office hours			