



## Course Weekly Outline

<b>Course Instructor</b>	Nada Najeel Kamal.
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<b>Title</b>	Database. For the branches: AI, DS, MM.
<b>Course Coordinator</b>	
<b>Course Objective</b>	<ul style="list-style-type: none"> <li>• Database definition.</li> <li>• The problems that leads to the emergence of database.</li> <li>• Data abstraction.</li> <li>• What are database management systems?</li> <li>• What must database administrator do?</li> <li>• Relational database and its design (tables, keys, types of relationships between tables, and table joining).</li> <li>• System architectures.</li> <li>• Indexing, Normalization and Transactions.</li> <li>• Database security.</li> <li>• Query algebra and query processing.</li> <li>• Structured query language and applying the previous theoretical concepts into a practical from (Laboratory)</li> </ul>
<b>Course Description</b>	<p>1 Introduction to Database.</p> <p>1.1 Introduction.</p> <p>1.2 What is a Data Base, and what are the problems that leads to the emergence of Databases?</p> <p>1.3 Files System.</p> <p>1.4 What is DBMS?: ADVANTAGES OF A DBMS</p> <p>1.5 Data Abstraction</p> <p>2 Database Models</p> <p>2.1 The Entity Relationship model</p> <p>2.2 The Relational model</p> <p>2.3 Object Based data model</p> <p>2.4 Hierarchical and Network data model</p> <p>3 Relational Database</p> <p>3.1 Instance and schemas</p> <p>3.2 Keys(Primary Keys, Foreign Keys</p> <p>3.3 Structured Query Language (SQL)</p> <p>3.4 Table Joining(Cross Join, Inner Join, Left Outer Join, Right Outer Join, Full Outer Join)</p> <p>4 Database Administrator</p>

	<ul style="list-style-type: none"> <li>5 Database Design <ul style="list-style-type: none"> <li>5.1 The Design Process</li> <li>5.2 Database Cardinality</li> <li>5.3 Weak Entity</li> </ul> </li> <li>6 Indexing and Hashing <ul style="list-style-type: none"> <li>6.1 Ordered Indices <ul style="list-style-type: none"> <li>6.1.1 Ordered Primary Index <ul style="list-style-type: none"> <li>6.1.1.1 Indices Types</li> <li>6.1.1.2 Index Update</li> </ul> </li> <li>6.1.2 Ordered Secondary Index</li> </ul> </li> <li>6.2. Hash Index <ul style="list-style-type: none"> <li>6.2.1 Hash File Organization</li> <li>6.2.2 Hash Index</li> </ul> </li> </ul> </li> <li>7 Normalization <ul style="list-style-type: none"> <li>7.1 Benefit of Normalization</li> <li>7.2 Levels of normalization <ul style="list-style-type: none"> <li>7.2.1 First Normal Form (1NF)</li> <li>7.2.2 Second Normal Form (2NF)</li> <li>7.2.3 Third Normal Form (3NF)</li> </ul> </li> </ul> </li> <li>8 System Architecture <ul style="list-style-type: none"> <li>8.1 Centralized system</li> <li>8.2 Client – Server database system</li> <li>8.3 Parallel database system</li> <li>8.4 Distributed database system</li> </ul> </li> <li>9 Transactions <ul style="list-style-type: none"> <li>9.1 Definition</li> <li>9.2 Implementation of atomicity and durability</li> <li>9.3 Concurrent Execution</li> </ul> </li> <li>10 Database Security <ul style="list-style-type: none"> <li>10.1 Introduction</li> <li>10.2 Security objective</li> <li>10.3 Access control</li> <li>10.4 Database encryption</li> <li>10.5 Database encryption level <ul style="list-style-type: none"> <li>10.5.1 Application-Level Encryption</li> <li>10.5.2 Database Encryption Level</li> </ul> </li> </ul> </li> <li>11 Fundamental of relational algebra ( Example 11.1, Example 11.2, Example 11.3)</li> <li>12 Query processing <ul style="list-style-type: none"> <li>12.1 Parsing and translation</li> <li>12.2 Optimization <ul style="list-style-type: none"> <li>12.2 1 Equivalent expression</li> <li>12.2 2 Disk I/O cost</li> <li>12.2 3 Projection Example</li> </ul> </li> <li>12.3 Evaluation</li> </ul> </li> </ul>
<b>Textbook</b>	Database system concepts, Abraham Sillberchatsz & Henry F. Korth, S. Sudarshan 6th Edition, Published by McGraw-Hill
<b>References</b>	– Lectures of other lecturers and from different universities

	(especially: Yasir M. Ismaeel – University of Technology- 2012, Sarmad Makki – Baghdad University- 2008) (Theoretical part). – "Foundations of Programming Databases" , Allardice S. (2013), (Theoretical part + Practical part). – Lectures of: Zainab Ali Yakoob 2012, Dr. Israa A. Ameer 2008, Saif Bashar Neama 2013 – University of Technology (Practical part)..				
<b>Course Assessment</b>	Term Tests	Laboratory	Quizzes	Project	Final Exam
	25%	20%	5%	----	50%
<b>General Notes</b>	Laboratory: Structure Query Language (SQL) and Procedural Structure Query Language (PL/SQL). In the Courses there are two daily exams. At every Lab. Lecture there is an exam with previous lecture.				

**Republic of Iraq**  
**The Ministry of Higher Education**  
**& Scientific Research**



**University: University of Technology.**  
**College: Computer Science.**  
**Department: Software.**  
**Stage: Second, Third.**  
**Lecturer name: Nada Najeel Kamal.**  
**Academic Status: Assit. Lecturer.**  
**Qualification: Msc. Computer Science.**  
**Place of work: UOT-CS.**

## Course weekly Outline

week	Date	Topics Covered	Lab. Experiment Assignments	Notes
1	Week 3 Month 9	1-1.2	What is Oracle?	
2	Week 4 Month 9	1.3 - 1.4	VM installation	
3	Week 1 Month 10	1.5	SW Installation	
4	Week 2 Month 10	2-2.2	Data types	
5	Week 3 Month 10	2.3-2.4	Introduction to SQL	
6	Week 4 Month 10	3.3-1	Create and copy tables	
7	Week 1 Month 11	Examples on Keys	Altering tables	
8	Week 2 Month 11	3.2	Altering tables	Continue.
9	Week 3 Month 11	3.3	Drop table	
10	Week 4 Month 11	3.4	Insert into table	
11	Week 1 Month 12	Cont. 3.4	Update table	
12	Week 2 Month 12	4	Delete records	
13	Week 3 Month 12	5-5.1	Select information	
14	Week 4 Month 12	Cardinality Examples	Select information	Continue.
15	Week 1 Month 1	5.2	Table joining	
16	Week 2 Month 1	5.3	Practical exam	
<b><u>Half-year Break</u></b>				
17	Week 3 Month 2	6.1-6	constraints	
18	Week 4 Month 2	6.1.1-6.1.1.1	constraints	Continue.
19	Week 1 Month 3	6.1.1.2-6.1.2	Mathematical Expres.	
20	Week 2 Month 3	6.2-6.2.2	Sorting	
21	Week 3 Month 3	7.2.1-7	Characters	

22	Week 4 Month 3	7.2.2-7.2.3	Conversion function	
23	Week 1 Month 4	8-8.2	Group functions	
24	Week 2 Month 4	8.3-8.4	Privileges	
25	Week 3 Month 4	9-9.2	view	
26	Week 4 Month 4	9.3	index	
27	Week 1 Month 5	10-10.3	PL/SQL	
28	Week 2 Month 5	10.5.2-10.4	PL/SQL	
29	Week 3 Month 5	11	PL/SQL	
30	Week 4 Month 5	11.1-11.3	PL/SQL	
31	Week 1 Month 6	12-12.2	PL/SQL	
32	Week2 Month 6	12.2.1-12.3	Practical exam	

**Instructor Signature:**

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