

**ATTACHMENT 2 (e)**

**Course Specifications**

**Kingdom of Saudi Arabia**

**The National Commission for Academic Accreditation & Assessment**

**Course Specifications  
(CS)**

## Course Specifications

Institution :- Najran University	Date of Report
College/Department : College of Science and Arts Sharoura / Department: Computer Science	

### A. Course Identification and General Information

1. Course title and code: Title: Principles of Database Systems Code: 402 IS-3 (٣-٤٠٢ نال)			
2. Credit hours : 3 hours			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Computer Science Program			
4. Name of faculty member responsible for the course Dr. Khadija Mohammed Al-Aidarous			
5. Level/year at which this course is offered: Level 4 / 2 <sup>nd</sup> year			
6. Pre-requisites for this course (if any) 301IS-3 (Fundamentals of Information Systems)			
7. Co-requisites for this course (if any)			
8. Location if not on main campus Male and Female Branches			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="100%"/>
b. Blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:  We still teach this course using traditional methods but there is a plan to transform all course into electronic format using E-learning			

## B Objectives

<p>1. What is the main purpose for this course? By the end of this course student should be able to:</p> <ol style="list-style-type: none"> <li>1) Remember the knowledge and basic concepts in database systems.</li> <li>2) Retrieves adequate theoretical background in database systems to further knowledge and scientific research development after graduation.</li> <li>3) Design systems based on computer and uses appropriate programming languages to meet the requirements in the field of database systems.</li> <li>4) Use Independent and creative logical thinking in the field of database systems used.</li> <li>5) Apply experiences in an integrated database design.</li> <li>6) Apply self-reliance skills and uses continuous learning in the field of self-development.</li> </ol>
<p>2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)</p>

## C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

This course aims to discuss the basic concepts and design of database. It starts with an introduction to the database concepts with a description about the manual file systems and their evolution. Then data models are discussed with degrees of data abstraction. SQL is also presented briefly followed by the relational model. The course focuses on how to design databases for given problems, and how to use database effectively, these include: ER model, key and participation constraints. Advanced data modeling will cover Extended ER model with some design cases. Finally, functional dependencies, decomposition and normalization are discussed with examples.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
<p><b>Database Concepts</b></p> <p><b>Introduction</b></p> <ol style="list-style-type: none"> <li>1. The purpose of database</li> <li>2. Data vs. Information</li> <li>3. Metadata, DBMS (Role and Advantages)</li> <li>4. Types of Databases</li> </ol> <p><b>Evolution of File System Data Processing</b></p> <ol style="list-style-type: none"> <li>1. Manual File Systems</li> <li>2. Computerized File Systems</li> </ol> <p><b>Problems with File System Data Processing</b></p> <ol style="list-style-type: none"> <li>1. Structural and Data Dependence</li> <li>2. Data Redundancy</li> </ol> <p><b>Database Systems</b></p> <ol style="list-style-type: none"> <li>1. The Database System Environment</li> <li>2. DBMS Functions</li> </ol>	1.5	3

<b>Data Models</b> <b>Data Modeling and Data Models</b> <b>The Importance of Data Models</b> <b>Data Model Basic Building Blocks</b> <b>Business Rules</b> <b>The Evolution of Data Models</b> <ol style="list-style-type: none"> <li>1. The Relational Model</li> <li>2. The Entity Relationship Model</li> <li>3. The Object-Oriented (OO) Model</li> </ol> <b>Degrees of Data Abstraction</b> <ol style="list-style-type: none"> <li>1. The External Model</li> <li>2. The Conceptual Model</li> <li>3. The Internal Model</li> <li>4. The Physical Model</li> </ol>	1.5	3
<b>Introduction to Structured Query Language (SQL)</b>	1	2
<b>The Relational Database Model</b> <b>A Logical View of Data</b> <ol style="list-style-type: none"> <li>1. Tables and Their Characteristics</li> </ol> <b>Keys</b> <b>Integrity Rules</b> <b>Relational Set Operators</b> <b>The Data Dictionary and the System Catalog</b> <b>Relationships within the Relational Database</b> <ol style="list-style-type: none"> <li>1. The 1:M Relationship</li> <li>2. The 1:1 Relationship</li> <li>3. The M:N Relationship</li> </ol> <b>Indexes</b>	2	4
<b>Entity Relationship (ER) Modeling</b> <b>The Entity Relationship Model (ERM)</b> <ol style="list-style-type: none"> <li>1. Entities</li> <li>2. Attributes</li> <li>3. Relationships</li> <li>4. Connectivity and Cardinality</li> <li>5. Existence Dependence</li> <li>6. Relationship Strength</li> <li>7. Weak Entities</li> <li>8. Relationship Participation</li> <li>9. Relationship Degree</li> <li>10. Recursive Relationships</li> <li>11. Associative (Composite) Entities</li> </ol> <b>Developing an ER Diagram</b>	3	6
<b>Submitting Projects + Presentation</b>	1	2

<b>Advanced Data Modeling</b> <b>The Extended Entity Relationship Model</b> <ol style="list-style-type: none"> <li>1. Entity Supertypes and Subtypes</li> <li>2. Specialization Hierarchy</li> <li>3. Inheritance</li> <li>4. Subtype Discriminator</li> <li>5. Disjoint and Overlapping Constraints</li> <li>6. Completeness Constraint</li> <li>7. Specialization and Generalization</li> </ol> <p>Entity Integrity: Selecting Primary Keys Natural Keys and Primary Keys Primary Key Guidelines When to Use Composite Primary Keys When to Use Surrogate Primary Keys</p> <b>Design Cases: Learning Flexible Database Design</b> <ol style="list-style-type: none"> <li>1. Design Case #1: Implementing 1:1 Relationships</li> <li>2. Design Case #2: Maintaining History of Time-Variant Data</li> </ol>	2	4
<b>Normalization of Database Tables</b> <b>Database Tables and Normalization</b> <b>The Need for Normalization</b> <b>The Normalization Process</b> <ol style="list-style-type: none"> <li>1. Conversion to First Normal Form</li> <li>2. Conversion to Second Normal Form</li> <li>3. Conversion to Third Normal Form</li> </ol> <b>Improving the Design</b> <b>Surrogate Key Considerations</b> <b>De-normalization</b>	3	6

1. Topics to be Covered in Lab		
List of Topics	No. of Weeks	Contact Hours
SQL server Environment	1	2
Data Definition Commands	2	4
Data Manipulation Commands	2	4
SELECT Queries	1	2
Additional Data Definition Commands	2	4
Additional SELECT Query Keywords	2	4
Virtual Tables: Creating a View	2	4
Joining Database Tables	2	4

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	30	-	30			60
Credit	30	-	15			45

3. Additional private study/learning hours expected for students per week.	<input type="text"/>
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy
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Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The *National Qualification Framework* provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

On the table below are the five NQF Learning Domains, numbered in the left column.

**First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated

learning and teaching process. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Mention principles, concepts and knowledge necessary for the database systems.	Lecture and Discussion	Achievement Test, Home Duties
1.2	Retrieve adequate theory of the concept of databases and database systems background.	Lecture and Discussion	Achievement Test, Home Duties
1.3	Compare between the databases systems, file system.	Lecture and Discussion	Achievement Test, Home Duties
1.4	Know the steps in the development of Database and the advantages and disadvantages of the different models	Lecture and Discussion	Achievement Test, Home Duties
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Designed an integrated database using SQL.	Lecture , Discussion and laboratory	Achievement Test, Home Duties, testing in laboratory
2.2	Use independent logical and creative thinking in the design of databases and handling.	Lecture , Discussion and laboratory	Achievement Test, Home Duties, testing in laboratory
2.3	Apply laboratory experiments related to the design and dealing with databases.	Lecture , Discussion and laboratory	Achievement Test, Home Duties, testing in laboratory
2.4	Establish the database design.	Lecture , Discussion and laboratory	Achievement Test, Home Duties, testing in laboratory
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Apply the skills of self-reliance gained from database systems.	Lecture , Discussion and laboratory	Home Duties, observation in laboratory
3.2	Use a continuous learning in the field of self-development.	Lecture , Discussion and laboratory	Home Duties, observation in laboratory
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
4.1	Know the constraints and controversies associated with relational database model.	Lecture , Discussion and laboratory	Home Duties, observation in laboratory
4.2	Know the scope and extension of SQL	Lecture , Discussion and laboratory	Home Duties, observation in laboratory
<b>5.0</b>	<b>Psychomotor</b>		
5.1	NaN		
5.2	NaN		

### Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

NQF Learning Domains	Suggested Verbs
<b>Knowledge</b>	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write
<b>Cognitive Skills</b>	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise
<b>Interpersonal Skills &amp; Responsibility</b>	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
<b>Communication, Information Technology, Numerical</b>	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize
<b>Psychomotor</b>	demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct

Suggested **verbs not to use** when writing measurable and assessable learning outcomes are as follows:

Consider	Maximize	Continue	Review	Ensure	Enlarge	Understand
Maintain	Reflect	Examine	Strengthen	Explore	Encourage	Deepen

Some of these verbs can be used if tied to specific actions or quantification.

#### **Suggested assessment methods and teaching strategies are:**

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.



#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

#### E. Learning Resources

##### 1. List Required Textbooks

1-Carlos Coronel, Steven Morris, and Peter Rob, "Database Systems: Design, Implementation, and Management", Joe Sabatino, 9th Edition, 2011.

##### 2. List Essential References Materials (Journals, Reports, etc.)

- 1) J. Ulman "A first course in Database systems", Prentice Hall, 3 Edition, 2007.
- 2) R. Elmasri and others "Fundamentals of database systems", Addison –wesley , 6 edition 2010.
- 3) R.Ramakrishnan, J.Gehrke - "Database Management Systems." 2<sup>nd</sup> edition 20

##### 3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

##### 4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

2. Computing resources (AV, data show, Smart Board, software, etc.)

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

#### G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- ✓ Distribution of a questionnaire for students to know how to achieve the goals in the theoretical and practical side.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

<ul style="list-style-type: none"> <li>✓ Discussions with colleagues who specialize in teaching methods and means of learning.</li> <li>✓ Self-evaluation of the performance of the teacher.</li> <li>✓ Discussions with other colleagues who taught this course.</li> </ul>
<p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>✓ Diagnose weaknesses and turn them into strengths.</li> <li>✓ Discussions about the decision and methods of teaching</li> <li>✓ Study the needs of the labor market of college graduates</li> </ul>
<p>4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)</p>
<p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p>

**Faculty or Teaching Staff: Dr. Khadija Mohammed Al-Aidarous**

**Signature:** \_\_\_\_\_ **Date Report Completed:** \_\_\_\_\_

**Received by:** \_\_\_\_\_ **Dean/Department Head**

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_