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|----------------|--|---|--|---|--|
| QF01/0408-4.0E | Course Plan for Bachelor program - Study Plan Development and Updating Procedures/<br>Artificial Intelligence Department |   |  |   |  |
| Study plan No. | 2021/2022  |   | University Specialization                              |   | Artificial Intelligence  |
| Course No.     | 0142251  |   | Course name  |   | Database   |
| Credit Hours   | 3 hours  |   | Prerequisite Co-requisite                              |   | Introduction to Information Technology   |
| Course type    | <input type="checkbox"/> MANDATORY UNIVERSITY REQUIREMENT  | <input type="checkbox"/> UNIVERSITY ELECTIVE REQUIREMENTS | <input type="checkbox"/> FACULTY MANDATORY REQUIREMENT | <input type="checkbox"/> Support course family requirements | <input type="checkbox"/> Mandatory requirements <input type="checkbox"/> Elective requirements |
| Teaching style | <input type="checkbox"/> Full online learning  |   | <input type="checkbox"/> Blended learning              |   | <input type="checkbox"/> <input checked="" type="checkbox"/> Traditional learning              |
| Teaching model | <input type="checkbox"/> 2Synchronous: 1asynchronous   |   | <input type="checkbox"/> 2 face to face : 1synchronous |   | <input type="checkbox"/> <input checked="" type="checkbox"/> 3 Traditional                     |

### Faculty member and study divisions information (to be filled in each semester by the subject instructor)

| Name            | Academic rank       | Office No. | Phone No.          | E-mail            |                |
|-----------------|---------------------|------------|--------------------|-------------------|----------------|
| Dr. DARA AQEL   | Assistant Professor | 231        | 327                | d.aqel@zuj.edu.jo |                |
| Division number | Time                | Place      | Number of students | Teaching style    | Approved model |
|                 |                     |            |                    | Traditional       |                |

### Brief description

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| This course provides a comprehensive concepts of the relational database design and SQL (implemented in Oracle) used with relational databases. The presentation stresses at relational data model; relational algebra; SQL; database analysis and design; ER and enhanced modeling; data normalization. |
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### Learning resources

|   |   |                               |   |                                 |  |
|---|---|-------------------------------|---|---------------------------------|--|
| Course book information (Title, author, date of issue, publisher ... etc)                     | Database Systems: Design, Implementation, and Management, 13 <sup>th</sup> edition, Cengage Learning, 2018, by Carlos Coronel, Steven Morris.   |                               |   |                                 |  |
| Supportive learning resources (Books, databases, periodicals, software, applications, others) | <ol style="list-style-type: none"> <li>1. Database System Concepts, 6<sup>th</sup> edition, McGraw Hill, 2010, by Abraham Silberschatz, Henry F. Korth, and S.Sudarshan.</li> <li>2. Guide to Oracle 10g, 5<sup>th</sup> edition, Course Technology, 2006, by Joline Morrison, Mike Morrison, Rocky Conard.</li> <li>3. Database Systems: Models, Languages, Design, and Application Programming, 6<sup>th</sup> ed, Pearson Inc., 2011, by Ramez A. Elmasri, Shamkant Navathe.</li> <li>4. Concepts of Database Management, 7<sup>th</sup> edition, Course Technology, 2012, by Philip J. Pratt, Joseph J. Adamski.</li> </ol> |                               |   |                                 |  |
| Supporting websites   |   |                               |   |                                 |  |
| The physical environment for teaching   | <input type="checkbox"/> <input checked="" type="checkbox"/> Class room   | <input type="checkbox"/> labs | <input type="checkbox"/> Virtual educational platform | <input type="checkbox"/> Others |  |
| Necessary equipment and software  | <b>Oracle SQL Plus</b>  |                               |   |                                 |  |
| Supporting people with special needs  |   |                               |   |                                 |  |
| For technical support   |   |                               |   |                                 |  |

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### Course learning outcomes (S= Skills, C= Competences K= Knowledge.)

| No.                | Course learning outcomes  | The associated program learning output code |
|--------------------|---|---|
| <b>Knowledge</b>   |   |   |
| K1                 | Understanding the basics of database development process.   | MK3   |
| K2                 | Recognizing the basic data structures needed to process and manage the databases.   | MK3   |
| K3                 | Understanding how to analyze, design, and build effective and reliable database management system as well as how to create a relational database. | MK3   |
| K4                 | Recognizing variety of entity relationship diagrams (ERD), and extended entity relationship diagrams (EERD).                                      | MK3   |
| K5                 | Understanding the concept of data normalization.  | MK3   |
| <b>Skills</b>      |   |   |
| S1                 | Identify problems in the design of file-based information systems that stimulate the use of the database system.                                  | MS3   |
| S2                 | Use the basic data structures needed to process and manage the databases.   | MS3   |
| S3                 | Use databases and employ them to create various computer applications.  | MS3   |
| S4                 | Use, apply, and implement SQL to create tables and databases.   | MS3   |
| S5                 | Map the ERDs and EERDs to their equivalent database schemes.  | MS3   |
| S6                 | Revise and correct all errors and remove anomalies in tables and databases based on data normalization.   | MS3   |
| <b>Competences</b> |   |   |
| C1                 | To apply the main concepts of database development process for problems solving in real life.   | MC1   |
| C2                 | To build effective database management systems.   | MC3   |
| C3                 | To create smart database applications that match the requirements and needs of the labor market.  | MC3   |
| C4                 | To build smart projects for databases.  | MC4   |

### Mechanisms for direct evaluation of learning outcomes

| Type of assessment / learning style    | Fully electronic learning | Blended learning | Traditional Learning (Theory Learning) | Traditional Learning (Practical Learning) |
|--|---------------------------|------------------|--|---|
| First exam                             | 0                         | 0                | %20                                    | 0   |
| Second / midterm exam                  | %30                       | %30              | %20                                    | 30%                                       |
| Participation / practical applications | 0                         | 0                | 10                                     | 30%                                       |
| Asynchronous interactive activities    | %30                       | %30              | 0                                      | 0   |
| final exam                             | %40                       | %40              | %50                                    | 40%                                       |

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**Note:** Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

### Schedule of simultaneous / face-to-face encounters and their topics

| Week | Subject   | learning style* | Reference **                                   |
|------|---|-----------------|--|
| 1    | <b>1. Introduction to Databases</b><br>Database-System Applications<br>Purpose of Database Systems<br>View of Data  | Lectures        | Supplementary<br>reference 1<br>Pages: 1-9     |
| 2    | <b>1. Introduction to Databases (continued)</b><br>Database Languages<br>Relational Databases<br>Database Design  | Lectures        | Supplementary<br>reference 1<br>Pages: 9-20    |
| 3    | <b>2. Creating and Modifying Database Tables (Cont.)</b><br>Oracle 10g Data Types<br>Constraints  | Lectures        | Supplementary<br>reference 2<br>Pages: 41-84   |
| 4    | <b>2. Creating and Modifying Database Tables (Cont.)</b><br>Creating Database Tables<br>Viewing Information About Tables<br>Modifying and Deleting Database Tables  | Lectures        | Supplementary<br>reference 2<br>Pages: 41-84   |
| 5    | <b>3. Using SQL Queries to Insert, Update, Delete, and View Data</b><br>Inserting Data into Tables<br>Creating Transactions and Committing New Data<br>Creating Search Conditions in SQL Queries<br>Updating and Deleting Existing Table Rows | Lectures        | Supplementary<br>reference 2<br>Pages:85-106   |
| 6    | <b>3. Using SQL Queries to Insert, Update, Delete, and View Data</b><br>Retrieving Data from a Single Database Table<br>Using Calculations in SQL Queries   | Lectures        | Supplementary<br>reference 2<br>Pages: 121-148 |
| 7    | <b>3. Using SQL Queries to Insert, Update, Delete, and View Data (Cont.)</b><br>Oracle 10g SQL Group Functions<br>Formatting Output   | Lectures        | Supplementary<br>reference 2<br>Pages: 121-148 |
| 8    | <b>3. Using SQL Queries to Insert, Update, Delete, and View Data (Cont.)</b><br>Joining Multiple Tables<br>Creating Nested Queries  | Lectures        | Supplementary<br>reference 2<br>Pages: 158-188 |
| 9    | <b>3. Using SQL Queries to Insert, Update, Delete, and View Data (Cont.)</b><br>Creating Nested Queries<br>Using Set Operators to Combine Query Results<br>Creating and Using Database Views  | Lectures        | Supplementary<br>reference 2<br>Pages: 158-188 |

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| 10             | <b>3. SQL: Data Manipulation</b><br>ANY and ALL<br>EXISTS and NOT EXISTS  | Lectures   | Supplementary<br>reference 1<br>Pages: 91-92   |
| 11             | <b>7. Database Design and the E-R Model</b><br>Overview of the Design Process<br>The Entity-Relationship Model<br>Constraints   | Lectures   | Supplementary<br>reference 1<br>Pages: 259-320 |
| 12             | <b>7. Database Design and the E-R Model (Cont.)</b><br>Constraints<br>Removing Redundant Attributes in Entity Sets<br>Entity-Relationship Diagrams<br>Reduction to Relational Schemas<br>Entity-Relationship Design Issues<br>Extended E-R Features | Lectures   | Supplementary<br>reference 1<br>Pages: 259-320 |
| 13             | <b>7. Database Design and the E-R Model (Cont.)</b><br>Extended E-R Features<br>Alternative Notations for Modeling Data<br>Other Aspects of Database Design   | Lectures   | Supplementary<br>reference 1<br>Pages: 259-320 |
| 14             | <b>8. Mapping a Conceptual Design into a Logical Design</b><br>Relational Database Design Using ER-to-Rational Mapping<br>Mapping EER Model Constructs to Relations<br>Mapping EER Model Constructs to Relations                                    | Lectures   | Supplementary<br>reference 3<br>Pages: 270-285 |
| 15             | <b>5. Database Design 1: Normalization</b><br>Functional Dependence<br>Keys<br>First Normal Form<br>Second Normal Form<br>Third Normal Form<br>Incorrect Decomposition  | Lectures   | Supplementary<br>reference 4<br>Pages: 155-172 |
| 16             | <b>Final Exam</b>   |  |  |

\* Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.

\*\* Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.