



زانکۆی پۆلیتیه کنيکی ههولير  
ERBIL POLYTECHNIC UNIVERSITY

## (Information Technology) Course Catalogue 2022-2023

<b>College</b>	Erbil Technology Collage	
<b>Department</b>	ICTE	
<b>Module Name</b>	Database concepts	
<b>Module Code</b>	DAT304	
<b>Semester</b>	3 <sup>rd</sup>	
<b>Credit</b>		
<b>Module type</b>	Core	
<b>Weekly hours</b>		
<b>Weekly hours (Theory)</b>	( 4 )hr Class	( )hr Workload
<b>Weekly hours (Practical)</b>	( 8 )hr Class	( )hr Workload
<b>Lecturer (Theory)</b>	Zanyar Shwan Ahmed	
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<b>Lecturer (Practical)</b>	Mrs Naila , Mrs.Asia , Mrs.Shene, Mrs.Rezhna	
<b>Email</b>		

## Course Book

- Course overview:**

This course will provide an introductory look at database concepts, emphasizing the relational database model. The course will also illustrate concepts and application of the entity relationship diagram as well as the principles and application of normalization. The student will understand the use of structured query language (SQL) to extract information from the database. We will also take a broad overview at some advanced databases topics such as, Web Database Development, Data Warehouses and Database Administration.

- **Course objective:**

### **Objectives**

This course introduces concepts and tools used in the planning, design, construction, and maintenance of databases.

### **Upon the completion of this course you should:**

1. Understand and be able to articulate the appropriate use, structure, and application of various database designs.
  2. Be able create, normalize, and optimize data models.
  3. Be fluent in the use of SQL and advanced SQL techniques for constructing, maintaining, and modifying databases.
  4. Understand the process of evaluating requestor requirements and translating those into technical specifications used in the creation of a database.
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### **Outcomes**

Upon completion of this course, learners should be able to:

- Describe the reasons and purpose of using a database
- Explain the conceptual foundation of the relational model for databases
- Demonstrate basic SQL statements for creating, querying, modifying and deleting data from a relational database
- Discuss the basic stages of database development and the role of the data model. Describe basic database design principles
- Explain the need for and importance of database administration and the need for security, backup and recovery
- Describe Web database processing
- Describe the basic concepts of data warehousing, OLAP, and data mining.

### • **Student's obligation**

Students who meet classroom obligations contribute to a positive learning environment.

The media often focuses on a teacher's role in making sure that students obtain a quality education. While teachers do have a strong impact on the learning process, students also have obligations to their teachers, their classmates and themselves. By

fulfilling their fundamental duties, students can contribute to a positive learning experience for everyone in the classroom.

## **Attendance**

Students should make every effort to maintain good attendance in their classes. Illnesses and emergencies do occur, so it may not be possible to show up every time. Nevertheless, students should do their best to consistently attend their lectures and get there before class begins.

## **Participation**

Each student should participate in the classroom. Discussing relevant subjects at appropriate times can spark new conversations and produce valuable debates.

## **Questions**

Asking questions about unclear material is an important part of the classroom experience. It is not uncommon for students to have similar difficulties, so speaking up will help everyone understand the discussed information.

## **Respect**

Students need to respect the ideas and opinions of their classmates in and outside of the classroom. They should not ridicule someone for having a different viewpoint, and they should be willing to listen to alternative perspectives.

## **Preparation**

Instructors expect students to study outside of the classroom. Students should complete assigned reading before class begins, so they can contribute their thoughts to new discussions. They should also finish homework before entering the classroom. Working on assignments during a lecture can distract other students and interfere with a teacher's lesson plan.

- **Forms of teaching**

Basic forms of teaching and learning shown here are:

- teaching by presentation;
- guided exploratory learning (class discussion);
- open learning;
- individual teaching;
- learning in projects.

- **Assessment scheme**

6% Mid. Theory exam

10% Mid. practical exam

4% Quiz

40% Activity

25% final practical

15% final theory

- **Specific learning outcome:**

- Interpret and explain the basic concepts of the relational model and understand its mathematical foundation,
- Apply SQL language to define, query and manipulate a relational database,
- Apply conceptual database modelling methods such as entity-relationship model to design a relational database,
- Research, justify and apply database design methods on functional dependencies and normal forms to evaluate the quality of a relational database design,
- Interpret and discuss query processing and optimization, transaction and security management in a relational database management system,
- Reflect upon state of the art of database management systems and big data management challenges.

- **Course Reading List and References:**

Fundamentals of Database Systems, 6th ed., Elmasri & Navathe, Addison-Wesley, 2011, ISBN:

978-013-608620-8.

Database Systems Concepts, 6th ed., Abraham S., Henry K., S. Sudarshan, McGraw-Hill, Inc. New

York, NY, USA ©2006 ISBN:0072958863 9780072958867.

An Introduction to Database Systems (8th Edition): C.J. Date: 9780321197849

Information Modeling and Relational Databases, Second Edition (The Morgan Kaufmann Series in

Data Management Systems): Terry Halpin, Tony Morgan: 9780123735683 .

Joe Celko's SQL for Smarties, Fifth Edition: Advanced SQL Programming (The Morgan Kaufmann

Series in Data Management Systems): 9780128007617 .

Practical Part:

Microsoft Access 2013 step by step ebook available on:

[http://www.pdfbooks.com/pdf/files/English/Software/Microsoft\\_Access\\_2013\\_Step\\_By\\_Step.pdf](http://www.pdfbooks.com/pdf/files/English/Software/Microsoft_Access_2013_Step_By_Step.pdf)

Microsoft Access 2010 step by step ebook available on:

<https://ptgmedia.pearsoncmg.com/images/9780735626928/samplepages/9780735626928.pdf>

Web resources and YouTube tutorials on MS Access & SQL

- **Course topics (Theory)**

**Week**

**Learning Outcome**

Welcome students to the new year and explain the materials that have written in the course book and then turn out the objectives of this course.	First Week	Explain the course objectives and outcomes of the database concepts.
Introduction to Database and Database Systems.	Second Week	What's database and database system.
File Based Systems.	Third Week	Understanding the database file system.
Data Types.	Fourth Week	Explain all database data types and how you can used in.
Table Relationships.	Fifth Week	Understanding all types of relationships and how we can used in database system.
Query and the logical-to-physical mapping; a key-value store.	Sixth Week	Explain queries in database.
Entity Relationships and E-R Diagrams.	Seventh Week	Understanding the entities and crating ER diagrams.
Database Security.	Eighth Week	What's security and how we can protects our database.
Database Administration.	Ninth Week	Understanding database administration.
Structured Query Language (SQL).	Tenth Week	Understanding the mother language of database(SQL)
SQL Languages (DDL, DML & DCL) and SQL Database Definition.	Eleventh Week	Define how to add, delete, insert, drop in sql.
Defining Views and Data Integrity Controls (Select, Delete, Update, Insert).	Twelves Week	What is the data integrity and processing data in a database.
<ul style="list-style-type: none"> <li><b>Practical Topics (If there is any)</b></li> </ul>	<b>Week</b>	<b>Learning Outcome</b>
MS ACCESS – OVERVIEW	First Week	Define Microsoft Access.
MS ACCESS — OBJECTS Table. Query. Form. Report. Other MS Access objects.	Second Week	Explain all objects in MS Access.
MS ACCESS — CREATE DATABASE Create blank Database.	Third Week	Learn how to create a database in MS Access.
MS ACCESS — DATA TYPES	Fourth week	Using all data types in MS Access.
MS ACCESS — CREATE TABLES	Fifth week	Learn create tables.

MS ACCESS – ADDING DATA	sixth week	How to add data in a table inside a database.
MS ACCESS – QUERY DATA, MS ACCESS – QUERY CRITERIA, MS ACCESS – ACTION QUERIES.	Seventh week	Understanding and using query.
MS ACCESS – CREATE QUERIES.	Eighth week	Learn to create a query.
MS ACCESS – CREATE RELATIONSHIPS	Ninth Week	Using all types of relationships.
MS ACCESS – JOINS	Tenth Week	Understanding of join an using all types of it.
MS ACCESS – CREATE A FORM	Eleventh Week	Understanding of form and how create it.
MS ACCESS – MODIFY A FORM .	Twelfth Week	Learn modification of form.

• **Examinations (question design):**

Q1/ define the following items:

- 1- Primary key
- 2- Relationship
- 3- Join.

Q2/ write sql code for the following actions:

- 1- Create database.
- 2- Create table.
- 3- Add a column in a table.

Q3/ count all types of the following statement:

- 1- Relationship.
- 2- Join.

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Answers:

Q1//

- 1- A primary key, also called a primary keyword, is a key in a relational database that is unique for each record. It is a unique identifier, such as a driver license number, telephone number (including area code), or vehicle identification number (VIN). A relational database must always have one and only one primary key. Primary keys typically appear as columns in relational database tables.
- 2- A relationship is established between two database tables when one table uses a foreign key that references the primary key of another table. This is the basic concept behind the term *relational database*.

- 3- A JOIN clause is used to combine rows from two or more tables, based on a related column between them.

Q2//

- 1- **CREATE DATABASE** *dbname*;
- 2- **CREATE TABLE** *table\_name*
- 3- **CREATE TABLE** *table\_name* (  
    *column1 datatype,*  
    *column2 datatype,*  
    *column3 datatype,*  
    ....  
);.

Q3//

- 1- Relationship:  
One-to-one    one-to-many    many-to-many
- 2- Join:
  - **(INNER) JOIN**: Returns records that have matching values in both tables
  - **LEFT (OUTER) JOIN**: Returns all records from the left table, and the matched records from the right table
  - **RIGHT (OUTER) JOIN**: Returns all records from the right table, and the matched records from the left table
  - **FULL (OUTER) JOIN**: Returns all records when there is a match in either left or right table

- **Extra notes:**

I have been reviewed this course book, its perfect and feet for this subject in the level of institute student, so I have no suggestion.

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