Study Guide

Database Development 171/181

Academic Year 2024

Updated 2024/07/02

"Research has shown that it takes 31 days of conscious effort to make or break a habit. That means, if one practices something consistently for 31 days, on the 32nd day it does become a habit. Information has been internalized into behavioral change, which is called transformation."

Shiv Khera

Academic Year 2024

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MODULE DESCRIPTION	
Module Name	Database Development 171/181
Module Code	DBD171/181
Qualification	Bachelor of Information Technology; Bachelor of Computing (all streams)
Module NQF Level	5
Duration (weeks)	4
Pre-requisites	None

Purpose

This module serves as an introduction to database design and development. Database normalization, data integrity, concurrent updates, and data security will also be discussed and practiced. The emphasis will be on using database management systems to build and maintain relational databases. The student will create databases, queries, custom forms, and reports.

Outcomes

Upon successful completion of this module, the student will be able to demonstrate:

- An informed understanding of the core areas of database design and implementation, and an informed understanding of the key terms, concepts, general principles, rules, and theories thereof.
- The ability to select and apply standard methods, procedures, or techniques regarding data manipulation, and to plan and manage an implementation process within a well-defined, familiar, and supported database environment.
- The ability to identify, evaluate and solve defined, routine, and new problems within a familiar context, and to apply solutions based on relevant evidence and procedures or other forms of explanation appropriate to the implementation of database objects, demonstrating an understanding of the consequences.
- The ability to gather information from a range of sources, including oral, written, with regard to user requirements, to select information appropriate to the development of a database system.
- The ability to operate in a range of familiar and new contexts, demonstrating an understanding of database systems, their constituent parts, and the relationships between these parts, and to understand how actions in one area impact on other areas within the same system.

STUDENT SUPPORT

Please contact your lecturer for subject-related support. The lecturers presenting this subject are:

- Gift T. Mudare - Mudare.G@belgiumcampus.ac.za
- Shakeng Delayed Thamaga - thamaga.s@belgiumcampus.ac.za
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If the lecturers were unable to assist, you can also contact the cluster head for this subject:

- Mr D. Sundire – sundire.d@belgiumcampus.ac.za

Further student support services are available via the counsellors:

- Alisha Narine - narine.a@belgiumcampus.ac.za
- Lethlabile L. Selamolela – selamolela.l@belgiumcampus.ac.za

ASSESSMENT PLAN			
ASSIGNMENTS/PROJECTS			
Assignment 1 Weight:	5%	Assignment 1 Due Date:	2024-07-22
Assignment 2 Weight:	5%	Assignment 2 Due Date:	2024-07-29
Project Weight:	20%	Project Weight Due Date:	2024-08-07
TESTS			
Class Test 1 Weight:	10%	Class Test 1 Date:	2024-07-19
Class Test 2 Weight:	10%	Class Test 2 Date:	2024-07-26
Class Test 3 Weight:	10%	Class Test 3 Date:	2024-08-02
Summative Test Weight:	40%	Summative Test Date:	2024-08-09

STUDENT RESOURCES Which resources will be used during this module?	
PRESCRIBED MATERIAL	
Textbook 1	
Harrington, J.L. (2016). *Relational Database Desing and Implementation*. Morgan Kaufmann. [ISBN: 9780128499023-003]	
Location (Library / URL / PDF)	https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1214612&site=ehost-live (Accessed: 2 July 2024)
Textbook 2	
McFadyen, R., 2016. *Relational Databases and Microsoft Access*. Ron McFadyen.	
Location (Library / URL / PDF)	https://ecampusontario.pressbooks.pub/relationaldatabasesandmicrosoftaccess365/
RECOMMENDED READING	
Coronel, C. and Morris, S., 2019. *Database Systems: Design, Implementation, & Management*. 13th ed., Cengage Learning.	
Location (Library / URL / PDF)	
Location (Library / URL / PDF)	
STUDENT MATERIAL	
Item	**Location**
Content on Moodle	The relevant Moodle course
PowerPoint slides	Distributed to students via Moodle
Exercises / Activities	Dispersed throughout the course on Moodle. Some quizzes to be hosted on Moodle.
TECHNOLOGY (HARDWARE OR SOFTWARE) REQUIRED	
Software/Hardware	**Responsible lecturer, availability on campus, recommended versions**
Microsoft Access 365	Installed on campus PCs

LESSON PLAN OUTLINE	
Date	**Specific outcomes (SO) to be covered / Class Activity / Assessment**
Day 1	SO1: Database Design
Day 2	SO1: Database Design SO1: Normalization
Day 3	SO1: Normalization
Day 4	SO2: Designing the Database Objects
Day 5	**Class Test 1**
Day 6	SO2: Creating Databases and Tables *Assignment 1 Due*
Day 7	SO2: Creating Relationships and Entering data
Day 8	SO3: Queries
Day 9	SO3: Queries
Day 10	**Class Test 2**
Day 11	SO4: Structured Query Language (SQL) in Access *Assignment 2 Due*
Day 12	SO4: Structured Query Language (SQL) in Access
Day 13	SO4: Structured Query Language (SQL) in Access
Day 14	SO5: Creating Forms *Assignment 2 Due*
Day 15	**Class Test 3**
Day 16	SO5: Creating Forms
Day 17	SO6: Creating Reports
Day 18	SO7: Basic Database Networking *Project Due*
Day 19	*Project Presentations*
Day 20	**Summative Test**

OUTCOME BREAKDOWN

Specific Outcome 1: Database Design

- Basic Database Concepts
- Database Management Systems
- Data Models
- Levels of Data Abstraction
- Entity-Relationship Model
- Key Constraints
- Indexes
- Goals of Normalization
- Data Anomalies
- Normalization Process (1NF-3NF)

- Functional Dependencies
- Higher Normal Forms (BCNF & 4NF)
- Normalization and Database Design
- Database design strategies
- Denormalization and design trade-offs

Specific Outcome 2: Implementation of Physical Database Design

- Understand database objects
- Understand the steps for designing database objects in Microsoft Access RDBMS
- Create Databases and Tables
- Identify and choose data types
- Choose primary keys
- Set field properties
- Identify and create relationships
- Enforce referential integrity
- Understand the cascade update and delete options
- Understand a datasheet
- Add, modify and delete records
- Change a table design

Specific Outcome 3: Data management

- Understand filters
- Describe and explain types of queries
- Create database queries
- Work with query operators and expressions
- Understand SQL Aggregate Functions
- Understand different types of Joins and create Join queries

Specific Outcome 4: Data Manipulation with Structured Query Language (SQL)

- Understand SQL Syntax
- Describe and explain SQL command categories
- Understand SELECT queries
- Understand SQL Operators
- Understand SQL Aggregate Functions
- Understand SQL Data Manipulation Commands
- Understand SQL JOINs

Specific Outcome 5: Form Creation

- Understand categories of database applications
- Create forms
- Understand different form views
- Understand control categories
- Add text boxes, bound controls and calculated fields
- Work with advanced form controls
- Create sub forms, Split Forms and Navigation forms

Specific Outcome 6: Report Creation

- Categorize Types of Access Reports
- Create Reports
- Understand different report views
- Add Calculated Controls to a Report
- Perform Grouping and Sorting of a Report
- Apply Conditional Formatting to Reports

Specific Outcome 7: Basic Database Networking

- Understand different options available to share Access data
- Share a single database using network folders
- Share a split database
- Share data on a SharePoint site
- Share data by using a database server
- Compare the benefits and limitations of each option