

CS2403: DATA MANAGEMENT AND CLOUD STORAGE

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Data Management and Cloud Storage

Subject Code

CS - Computer Science

Course Number

2403

Academic Unit

Computer Science (CS)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

CS2313 Computer Programming

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course is aimed at equipping students with the knowledge of database design, as well as, the ability to use database management systems in an effective manner. The course will also provide the knowledge of how to use a relational database system (RDBMS) for analytical processing. For the cloud storage part of the course, the students will also learn how to use an elastic computing service to host a database and retrieve data from it.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Design a database schema using the entity-relationship and relational data models.		x	x	x
2	Improve an existing database schema through the normalization process.		x		x
3	Use SQL as a Data Definition Language (DDL) and a Data Manipulation Language (DML) effectively.		x		x
4	Demonstrate the ability to use an RDBMS to manipulate data in data science applications, and the ability to use a cloud storage to host an RDBMS.			x	x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture: Materials will cover database design principles, SQL, as well as, techniques and concepts related to database management systems.	1, 2, 3, 4	3 hours/week

2	2	Hands-on practice: The instructor will arrange tutorials and labs where each student can practice solving database problems and using an actual database management system.	1, 2, 3, 4	8 hours/semester
3	3	Class assignments/ project: Students will also have the opportunity to use their database knowledge to solve real-world data management problems through assignment/project questions.	1, 2, 3, 4	After Class

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	Project/Assignments	1, 2, 3, 4	15	One Project and Two Assignments
2	In-class discussion	1, 2, 3, 4	5	
3	Midterm Examination	1, 2, 3	20	

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

2

Additional Information for ATs

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Assessment Rubrics (AR)**Assessment Task**

Project/Assignments

Criterion

1.1 Ability to design a database using a data modeling principles covered in the course

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Inadequate

Assessment Task

Project/Assignments

Criterion

1.2 Ability to translate express a database design in SQL

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Inadequate

Assessment Task

Project/Assignments

Criterion

1.3 Ability to use a database management system to store and manipulate data

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Inadequate

Assessment Task

Project/Assignments

Criterion

1.4 Ability to interface an RDBMS with the Python programming language

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Inadequate

Assessment Task

Project/Assignments

Criterion

1.5 Ability to use a cloud storage to host an RDBMS

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Inadequate

Assessment Task

In-class discussion

Criterion

2.1 Ability to contribute to discussions on principle and concepts of database design and database management systems

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Inadequate

Assessment Task

Midterm Exam

Criterion

3.1, 4.1 Ability to demonstrate a good understanding of basic and advanced materials covered in the course

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Inadequate

Assessment Task

Final Exam

Criterion

3.1, 4.1 Ability to demonstrate a good understanding of basic and advanced materials covered in the course

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Inadequate

Part III Other Information

Keyword Syllabus

Database design methodology: entity-relationship model, functional dependency, normalization, data definition language, Query Language: SQL, relational algebra, data model: relational model, index, file organisation, B-tree.

Reading List

Compulsory Readings

Title	
1	Elmasri R. and Navathe S. B. Fundamentals of Database Systems. 6th Ed. Addison Wesley (2010)

Additional Readings

Title	
1	Silberschatz A., Korth H. and Sudarshan S. Database System Concepts. 6th Ed. McGraw-Hill Companies Inc. (2010)