



## UNIVERSITY OF KWAZULU-NATAL

Department of Computer Science  
COMP306: Database Systems  
**Project Description**

18 February 2025

### Introduction

For your project, you're required to build a Java database application for a business scenario designed by yourself. The application will allow a user to:

- Create a new record
- Update an existing record
- Delete an existing record
- Display three reports of significant complexity (SQL query must access at least three tables) based on the records stored in the database

The reports will be in the form of three GUI screens that display information derived from the database. For example, if you've developed a High School Assessment Management system, then you may create the following three reports/screens:

- ❖ All Mathematics and Science teachers who were able to improve the class aggregate by 5% or more across all the classes they are teaching
- ❖ Which extra-curricular activity is most correlated with the highest academic achievement for Grade 8 students, as measured by each student's aggregate mark
- ❖ List all students who have achieved a 5% or more increase for each subject from the previous term

### Phase 1: Draft of Business Scenario [5%]

The High School Assessment Management system above is only an example business scenario. In this first phase you are required to define your own business scenario for this project. The following must be noted about the business scenario you develop:

- You will be assessed on your ability to work with multiple database tables in MySQL and Java. Therefore, your scenario needs to contain **at least fifteen** entities
- Your business scenario must have at least **three** supertype/subtype hierarchies, fully specified with the appropriate constraints
- Your business scenario should contain enough detail to enable the extraction of attributes for all entities

- The description of relationships between entities must be clear and specify cardinality constraints
- The scenario should be written in narrative form, i.e. as one or more paragraphs, and not in list form

You will submit your scenario as a PDF document via an assignment submission activity on Moodle.

**[Due date: 14 March 2025]**

## **Phase 2: ER/EER Model and Relational Schema [20%]**

Using the business scenario you drafted in Phase 1, in this phase you're required to create an EER model. You will then translate this EER model into a relational schema in the 3<sup>rd</sup> Normal Form. The EER model must be designed using [draw.io](https://draw.io) or a similar illustration software package to ensure a professional diagram.

Both the EER and relational schema must be presented in a single PDF document each, which will be submitted via an assignment activity on Moodle.

**[Due date: 28 March 2025]**

## **Phase 3: Database Construction [20%]**

Using the relational schema you constructed in Phase 2, you are required to create the SQL files needed to generate the corresponding tables in MySQL. You must specify appropriate data types for all attributes, a primary key for all tables and any other suitable constraints on the columns or tables.

Furthermore, you're required to define constraints to ensure referential integrity, especially in the case that records are deleted from a table. You must also implement at least **two** stored procedures, and at least **two** triggers.

You must include `CHECK ()` constraints and `DEFAULT` values for at least 50% of the columns in your database.

The SQL code must be submitted in a single SQL file, which will be uploaded to a Moodle submission activity.

**[Due date: 25 April 2025]**

## **Phase 4: Development of Java Application [55%]**

In this final phase, you're required to build the Java application that will perform the functions outlined in the introduction of this project specification. You will also need to populate the database with data that allow you to test the functionality of the application.

Finally, you'll be required to record a **10-minute** presentation video that demonstrates the features of your application and how all of the project specifications have been met. The video will be uploaded to a Moodle submission activity. Alternatively, if the file is too large, a link can be provided to its location in the cloud.

**[Due date: 16 May 2025]**