**DISCIPLINE OF INFORMATION SYSTEMS AND TECHNOLOGY**
**SCHOOL OF MANAGEMENT, IT AND GOVERNANCE**

# Programming and Databases (ISTN212)
# Project specifications document

## Introduction

ISTN212, titled Programming and Databases, is aimed at developing the student's knowledge of two important aspects of Systems Development i.e. Programming and Databases. The course is also an important stepping stone in preparing the student for the Major project covered in ISTN 3rd year modules (ISTN3AS and ISTN3SI)

## Project Objectives

You are required to develop an application using Visual Basic 2015 that applies certain database and programming content covered in this module. Your application should be based in a real world context and not just random code segments showing your abilities to apply knowledge covered i.e. your application (database and underlying code) should logically contribute towards solving a problem or set of problems. Examples of systems would be Point of Sales systems, stock control systems, data capturing applications, appointment systems, educational applications etc.

**Note that simply copying and/or making slight changes to current practical and/or lecture applications/demonstrations is not allowed and is bordering on plagiarism.**

## Development Constraints

Programming Language – Students must use Visual Basic 2015 (part of Visual Studio 2015 package). The use of later versions will only be allowed after consultation and approval with the course (site) co-ordinator

Database Management System – Microsoft SQL Server Management Studio 2014. All registered students should have access to create their own database tables and relationships.

Team Dynamics

In anticipation of entering ISTN 3rd year, this assignment must be done within a small group environment. Each group MUST be made up of a minimum of 4 and a maximum of 6 students. Individual submissions are not allowed and any other combinations (below 4 or more than 6) will only be allowed after consultation with the course (site) co-ordinator (who must agree).

Project Requirements

1. Group members and team name
2. Project Background – A brief background stating the project that is being undertaken and the need for the system
3. An entity relationship diagram (ERD) outlining the database design. The number of database tables should be at least three and not exceed eight. The ERD must display all relationships, keys and attributes. The ERD should be in 3rd normal form. The ERD must be drawn using Microsoft Visio (the version currently installed in the UKZN LANs).
4. Implemented database based on ERD design using SQL Server Management Studio 2014
    a. Tables, relationships, keys and attributes must match ERD design. **Each group member was allocated an account, one of which must be used for the project Database. The account details used must be included in the documentation.**
    b. Tables must be populated with valid data (at least five records per table). No junk data (e.g. Student name: slkdjalkdsjlka, address: skdhkj etc.)
5. A Visual Basic 2015 application that connects to the database specified in requirement 4.

a. The application should allow for CRUD - creation, viewing, updating and deleting of data from the database tables.
b. At least one search facility should be implemented
c. Error checking and data validation should be demonstrated as much as possible.

6. Demonstrate the use of SQL as a DML by writing SQL statements for your database. You are required to submit different SQL statements based on the following. For each requirement state why the results would prove useful for the business/organization that you are dealing with.
    a. A SQL statement that extracts and displays all data from a database table
    b. A SQL statement that will update values of a table
    c. At least three SQL statements with a WHERE clause
    d. At least two SQL subqueries
    e. At least two aggregation queries

For example:

```
Select StudNum, StudName from Students Where StudNum IN (Select StudNum from SMarks Where Mark < 40)
```

*The above inner SQL query finds all the students whose mark is less than 40. From this list of students, we get the names of these students via the Students table. This statement would be useful for an Academic Development Officer (ADO) that is searching for all students that failed the test. S/he can then contact these students for revision sessions.*

Submission

Each group will be required to submit the following:

- A Visual Basic Project folder with all required VB files and resources
- A professionally presented document outlining the group details, application background, ERD design (requirement 3) and SQL queries based on database

(see requirement 6). **The document must also contain the login details of the SQL server account used.**

The Visual Basic Project Folder must be compressed into a single .ZIP file and the documentation must be submitted as .PDF. A submission folder will be made available on Moodle for submission. To ensure easier administration, please ensure that you submit to the correct submission folder based on your campus.

Should your application be too large to submit to Moodle (due to external resources such as images, videos and documents), as a group, you will be required to make arrangements to submit the project personally to the site-coordinator. In this case, the project must be submitted via virus-free USB memory stick (flash memory). This submission must also be made before the deadline. It is your responsibility to ensure that you get your USB memory stick back (should you want it back).

## Marking

The application and documentation will be marked based on the assessment matrix provided at the end of this document. In addition, each group will submit a peer evaluation form outlining each individual's contribution to the project.

## Contribution

The developed application will count 70% towards the project with the documentation contributing 30%. The peer evaluation will determine the distribution of the mark achieved.

## Due Date

The project with associated documentation and files must be submitted to the Moodle folder by Friday, 27th September 2019, 15:00.

Assessment Matrix (Main Application)

| No | Criteria | Strongly Agree (4) | Agree (3) | Neutral (2) | Disagree (1) | Strongly Disagree (0) |
|---|---|---|---|---|---|---|
| 1 | The application runs without any errors (syntax, runtime, logical) | | | | | |
| 2 | The GUI controls have been appropriately selected for efficient input and output | | | | | |
| 3 | The GUI suggests a neat and professional appearance and provides for a good user experience*. | | | | | |
| 4 | The application is able to interact (CRUD) with all relevant database tables | | | | | |
| 5 | The presented database tables are neatly and professionally displayed | | | | | |
| 6 | The application has a working search facility | | | | | |
| 7 | Exception handling is sufficiently covered to address runtime errors | | | | | |
| 8 | Data validation has been demonstrated | | | | | |
| 9 | The group has implemented features beyond the content of the course | | | | | |
| TOTAL (40) | | | | | | |
| Final Percentage (100) | | | | | | |

*Examples of good user experience may include (but not limited to):

Viewing an interface in multiple languages, searching via more than one field, relevant icons that have meaning, pleasant and customizable interface etc. Search for user experience design or user interface design for more on this topic.

Assessment Matrix (Database)

| No | Criteria | Strongly Agree (4) | Agree (3) | Neutral (2) | Disagree (1) | Strongly Disagree (0) |
|---|---|---|---|---|---|---|
| 1 | The ERD diagram has been neatly presented as per requirements | | | | | |
| 2 | The ERD diagram has minimal errors | | | | | |
| 3 | The design conforms to 3rd normal form | | | | | |
| 4 | The Database has been implemented according to the ERD design | | | | | |
| 5 | Data in the tables appear realistic and not junk data | | | | | |
| 6 | SQL statements provided are relevant to the problem and are important for business strategy | | | | | |
| TOTAL (24) | | | | | | |
| Final Percentage (100) | | | | | | |

Assessment Matrix (Documentation and overall)

| No | Criteria | Strongly Agree (4) | Agree (3) | Neutral (2) | Disagree (1) | Strongly Disagree (0) |
|---|---|---|---|---|---|---|
| 1 | The documentation is neatly and professionally presented | | | | | |
| 2 | The project/problem being address is based on real world context | | | | | |
| 3 | The entire project has been professionally presented and submitted**. | | | | | |
| TOTAL (12) | | | | | | |
| Final Percentage (100) | | | | | | |

**This includes:

- The project was submitted within the due date (and time)
- All required documentation and the main application were presented with nothing left out or submitted late i.e. login details, ERDs and main document in correct format, SQL login details provided etc.
- References included where/if necessary