RICHFIELD

FACULTY OF INFORMATION TECHNOLOGY

DATABASE SYSTEMS 600

ASSIGNMENT

Name & Surname:_____ **ITS No:**_____

Qualification:_____ **Semester:**_____ **Module Name:**_____

Date Submitted:_____

ASSESSMENT CRITERIA	MARK ALLOCATION	EXAMINER MARKS	MODERATOR MARKS
MARKS FOR CONTENT			
QUESTION ONE	15		
QUESTION TWO	10		
QUESTION THREE	30		
QUESTION FOUR	35		
TOTAL MARKS	**90**		
MARKS FOR TECHNICAL ASPECTS			
1.TABLE OF CONTENTS Accurate numbering according to the numbering in text and page numbers.	**2**		
2.LAYOUT AND SPELLING Font –Calibri 12 Line Spacing–1.0 Margin should be justified.	**3**		
3.REFERENCE According to the Harvard Method	**5**		
TOTAL MARKS	**10**		
TOTAL MARKS FOR ASSIGNMENT	**100**		
Examiner's Comments:			
Moderator's Comments:			
Signature of Examiner: **Signature of Moderator:**			

ASSIGNMENT INSTRUCTIONS

1. All assignment must be typed, not handwritten.
2. Every assignment should include the cover page, table of contents and a reference list or bibliography at the end of the document
3. A minimum of five current sources (references) should be used in all assignments and these should reflect in both in-text citations as well as the reference list or bibliography
4. In-text citations and a reference list or bibliography must be provided. Use the Harvard Style for both in-text citations and the reference list or bibliography
5. Assignments submitted without citations and accompanying reference lists will be penalized.
6. Students are not allowed to share assignments with fellow students. Any shared assignments will attract stiff penalties.
7. The use of, and copying of content from websites such as chegg.com, studocu.com, transtutors.com, sparknotes.com or any other assignment-assistance websites is strictly prohibited. This also applies to Wiki sites, blogs and YouTube.
8. Any pictures and diagrams used in the Assignment should be properly labelled and referenced.
9. Correct formatting as indicated on the Cover Page should be followed (font-size 12, font-style Calibri, line spacing of 1.0 and margins justified)
10. All Assignments must be saved in PDF using the correct naming-convention before uploading on Moodle. E.g. StudentNumber_CourseCode_Assignment (402999999_WBT512A_Assignment)

QUESTION ONE 15 MARKS

1.1 Functional dependency is a very important concept in the normalization of database tables. It is divided into, transitive dependency, partial dependency and full functional dependency. With the aid of examples, illustrate transitive dependency and fully functional dependency. **(8)**

1.2 In drawing entity-relationship (ER) diagrams, an entity set can be classified as either a strong entity set or a weak entity set. Using an ER diagram example, illustrate the two.

(7)

QUESTION TWO 10 MARKS

2.1 A view can be created from 1 or more database tables. If one of the tables is dropped, analyse and conclude if the view will be retained. **(4)**

2.2 Data collection and pre-processing are critical steps prior to moving data to a relational database. Justify the use of Hadoop in place of other software tools like SPSS in big data pre-processing. **(6)**

QUESTION THREE 30 MARKS

Read the following scenario and answer the questions that follow: Somhlolo Graduate Institute offers postgraduate and undergraduate courses in Information Technology and Business management. Each course is offered by one of the departments. There are many students enrolled with the institution. A student may be allowed to enroll in more than one course. Each course has many modules. Each lecturer teaches many students. One of the lecturers is a head of department. A course may have zero or more students. Each module is assigned to only one lecturer. There are many text books at the library for each of the modules.

3.1 From the above scenario, identify all entity sets. **(5)**

3.2 For each of the entity sets identified, suggest all possible attributes and indicate which of those attributes are primary keys**.** **(5)**

3.3 Draw an ER diagram for the above scenario. **(10)**

3.4 Given that each student that enrolls for a course is either a contact student or a distance learning student, extend your ER diagram to illustrate specialization and generalization concepts. **(6)**

3.5 Given that some of the lecturers are also students in the same institution, extend your ER diagram to show this overlapping constraint. **(4)**

QUESTION FOUR 35 MARKS

The following relation(table) contains data about employees in an institution of higher learning. Employees can have more than one designation or title and can belong to 1 or more departments as shown in this relation. A composite key (Designation, Emp_No, Dept_No) uniquely identifies each row.

Designation	Emp_Name	Emp_Add	Emp_No	Dept_No	Dept_Name	Dept_Location
Technician	Mdu	123 1st Road	001	100	MICT	Area 1
Technician	Moodley	555 2nd ST	005	100	MICT	Area 1
Receptionist	Zintle	222 Aim ST	003	200	Admin	Area 2
Marketer	Mbuso	321 Brad ST	002	600	Marketing	Area 3
Lecturer	Pillay	123 1st Road	009	500	BEMS	Area 4
Lecturer	Mdu	123 1st Road	001	100	MICT	Area 1
Lecturer	Moodley	555 2nd ST	005	100	MICT	Area 1
Lecturer	Mdu	123 1st Road	001	800	MBA	Area 5

The following are the attributes of this relation: Emp_Name: Name of employee, Emp_Add: Address of employee, Emp_No: Employee number, Dept_No: Department number, Dept_Name: Name of department, and Dept_Location: location of the department.

4.1 Identify the update and deletion anomalies in the above relation. **(5)**

4.2 Normalise the above relation up to Boyce Codd Normal Form (BCNF). For each of the normal forms, state the conditions and explain if the relation(s) meet the requirements for that normal form. Write down all the relations, indicating primary keys for each of them. **(20)**

Hint: the following functional dependencies exist:

Emp_No → Emp_Name, Emp_Add

Dept_No → Dept_Name, Dept_Location

Dept_Name → Dept_Location

4.3 Most library systems in the world use the Dewey Decimal System for the organization and classification of books and journal papers.

Briefly explain, how this system works. **(3)**

4.4 Which type of database is ideal for implementing these systems. Justify your choice? **(5)**

4.5 What is the main weakness of the type of database that you have chosen above? **(2)**

END OF ASSIGNMENT!!!