College of Business and Economics

Department of Applied Information Systems

LEARNING GUIDE

Information Systems 2A

IFS02A1

For

National Diploma – Information Technology

ACADEMIC YEAR

2022

Compiled by

Prof Kennedy N Njenga

www.uj.ac.za/bit

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Action words

Action words that you may be exposed to in this learning guide

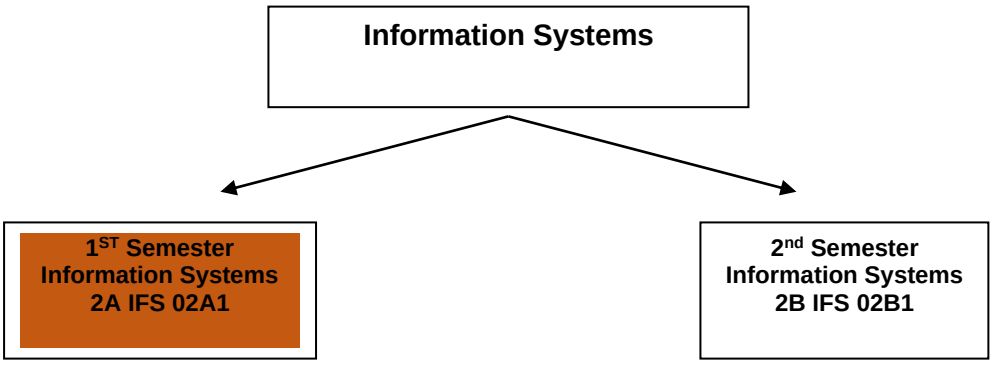
Apply	Put to practical use or make use of a relevant equation or law.
Calculate	Determine the value, using formulae or specific calculation methods.
Classify	Group concepts or subjects together based on certain characteristics or commonalities.
Compare	Point out the similarities and differences between objects or points of view. The word *contrast* can also be used.
Convert	Transform a quantity expressed in one unit to a quantity expressed in another unit.
Define	Give a short and clear description of a term or concept.
Demonstrate	Show clearly/prove/make clear by reasoning or evidence/illustrate and explain, especially with many examples.
Derive	Deduce or infer something from the given information.
Describe	Tell in detail how a process works or how a subject appears. You need not comment on the process or the subject or give your own point of view.
Differentiate	Find differences between objects or statements.
Discuss	Explain terms or concepts in your own words. Give comments or give your own point of view.
Distinguish	Write down the differences between subjects or concepts.
Draw	Create a drawing, diagram or representation of a subject or concept.
Explain	Write about the subject in your own words. Clarify or give reasons – it may be useful to use examples or illustrations. You must prove that you understand the content.
Formulate	Express in a concise, systematic way.
Identify	Establish the identity or recognise a process.
Illustrate	Explain by means of detailed descriptions and drawings.
Interpret	Explain or clarify the meaning of a concept/value.
List/Name	Briefly write down the facts or main points.
Motivate	Give reason(s) for your answer.
Name	Nominate or specify a site or process.
Organise	Arrange data according to certain criteria.
Predict	Use the facts available to derive an outcome.
Relate	Show the relation/connection of entities, how the concepts can be linked.
Solve	Find an answer by using critical thinking and/or calculations.
Summarise	Briefly state/list/write down only the most important detail/facts.
Understand	Show insight into or know the meaning/nature of a concept or term; to

	comprehend.

Table of Contents

1. COMPOSITION OF THE PROGRAMME

This module is part of Business Analysis III BAY33



NQF level	6
Credits (Calculated according to notional hours)	16
Study field (optional)	
Subfields (optional)	
Duration	16 Weeks

Please note:

- Module A and B and are Independent Modules
- You must pass all modules with 50% to pass the subject

Your learner guide is designed to assist you through this course and will guide you with preparation for classes, assignments and tests.

2. COURSE LECTURER

Lecturer: Prof K N Njenga
Tel: 011-559-1253
Fax:
Office: **G Purple 4**
E-mail: knjenga@uj.ac.za

Consultation Times:

Tue: 9:00 am – 10:00am
Thur: 9:00 am – 10:00am and 12:00 pm – 1:00pm
(For any other time please make appointment)

INTRODUCTION

The module introduces you to database design techniques and promotes the understanding of current database technologies. Database design concepts and procedures, practical problem solving are presented in this module so that students can fully develop real and useful design skills.

The module is divided into the following learning units;

Learning unit 1:	Database Systems
Learning unit 2:	Data Models (Part a)
Learning unit 3:	Data Models (Part b)
Learning unit 4:	The Relational Database Model (Part a)
Learning unit 5:	The Relational Database Model (Part b)
Learning unit 6:	Entity Relationship (ER) Modeling
Learning unit 7:	Normalisation of Database Tables (Part a)
Learning unit 8:	Normalisation of Database Tables (Part b)
Learning unit 9:	Introduction to Structured Query Language (SQL) (Part a)
Learning unit 10:	Introduction to Structured Query Language (SQL) (Part b)
Learning unit 11:	Advanced SQL (Part a)
Learning unit 12:	Advanced SQL (Part b)
Learning unit 13:	Database Design (Part a)
Learning unit 14:	Database Design (Part b)

3. PURPOSE

The purpose of the course is to introduce you the management issues of database design and development. The module deals with Transaction Management and Concurrency Control, Distributed Database Management Systems; and Database Administration and Security. Database Performance Tuning and Query Optimization is a valuable resource that shows how a DBMS manages data retrieval and is also included in this module.

4. TEACHING AND LEARNING STRATEGY

An integrated teaching and learning approach is followed in this module. This means that learning is facilitated by more than one support resource, e.g., face-to-face contact, Edulink, a learning guide and/or interactive CD – each of which is complementary to the other.

5. ASSESSMENT CRITERIA

One written examination of three hours, **two term tests**, and the evaluation of an **executive summary** will be assessed. **Group presentations** will also be formally assessed.

The **Semester mark** will be calculated as follows:

	Weight	**Assessment Date**	**Re-assessment Date**	**Scope of work to be covered by assessment**
Test 1	30%	**Test day:** Thursday 1st April **All day online**	*To be advised*	Learning Unit 1 – 7 (Chapter 1- 6 of text book)
Test 2	30%	**Test day:** Friday 7TH May **All day online**	*To be advised*	Learning Unit 7 – 14 (Chapter 7- 9 of text book)
Weekly Quizzes	10%	***continuous***	n/a	
Group Report	30%	***continuous***	n/a	
TOTAL	100%			

Class Tests (There will be 3 surprise tests)		

Examinations Type:

The subject is an examination subject.

- You need a **semester mark** of 40% to write the examination. The **semester mark** comprises of the average mark obtained from the two tests and the assignment and group presentations. **The final mark** will be calculated by semester mark (50%) + examination mark (50%).
- A minimum pass mark of 50% is required.
- To pass with distinction, a learner has to achieve at least 75% in the module and obtain more that 40% in the examination.

Supplementary Assessment:

There will only be one re-assessment per module for learners who produce a valid doctor's certificate after missing an assessment together with a completed application for writing the sick test **(See Appendix A)**. All assessments are compulsory. A weighted average of 50% constitutes a pass. Assessments not handed in on due date will not be marked and 0% awarded. This does not apply in the case of official absenteeism:

- Medical certificates; or
- Prior application (with confirmation from the sports bureau or cultural office) for participating in provincial, national or international sports or cultural events; or
- The death of a close family member or friend (a copy of the death certificate or funeral letter must be included as proof); or
- Other excuses deemed acceptable to the assessor

Medical certificates need to comply with the following:

The Ethical and Professional Rules of the Medical and Dental Professions Board of the Health Professions Council of South Africa

In terms of the Ethical and Professional Rules of the Medical and Dental Professions Board of the Health Professions Council of South Africa, the medical profession has introduced the following rules with respect to medical certificates:

Rule 15.(1) : A practitioner shall only grant a certificate of illness if such certificate contains the following information, namely:

a. the name, address and qualification of the practitioner;
b. the name of the patient;
c. the employment number of the patient (if applicable);
d. the date and time of the examination;
e. whether the certificate is being issued as a result of personal observations by the

practitioner during an examination, or as the result of information received from the patient and which is based on acceptable medical grounds;

f. A description of the illness, disorder or malady in layman's terminology with the informed consent of the patient: Provided that if the patient is not prepared to give such consent, the medical practitioner or dentist shall merely specify that, in his or her opinion based on an examination of the patient, the patient is unfit to work;
g. Whether the patient is totally indisposed for duty or whether the patient is able to perform less strenuous duties in the work situation;
h. the exact period of recommended sick leave;
i. the date of issuing of the certificate of illness; and
j. a clear indication of the identity of the practitioner who issued the certificate which shall be personally and originally signed by him or her next to his or her initials and surname in printed or block letters .

Rule 15(2): If pre-printed stationery is used, a practitioner shall delete words which are irrelevant.

Rule 15(3): A practitioner shall issue a brief factual report to a patient where such a patient requires information concerning himself or herself.

Sick supplementary assessment:

A supplementary assessment will only be given to students with a completed sick test application form **(See Appendix A)** and a valid doctor's certificate and. Learners must apply for the assessment within 7 working days after the assessment by completing an application form with relevant documentation with the secretary / lecturer.

A final supplementary evaluation may be given to students who obtain a final mark between 45% and 49%.

Feedback to learners:

Feedback of assessments will be available within 14 days. The results will be posted on the notice board and/or Edulink and the memorandum of the assessment will be discussed in class.

6. LEARNING MATERIAL

Textbooks:

Database Systems: Design, Implementation and Management. Carlos Coronel & Steven Morris -12th edition Cengage Learning

ISBN 978-1-305-62748-2

Other Learning Material:

Additional lecture notes will be provided

Recommended:

To be advised

7. REGISTER AND CLASS ATTENDANCE

Please note that it is the learner's responsibility to catch up on any classes missed, irrespective of the reason why he/she missed the class. Make arrangements with another learner concerning notes handed out; to check whether arrangements regarding assignments had been made, etc.

8. WORK SCHEDULE

Proposed schedule for the module:

Semester 1

Week Beginning	Sessions	Topic / Outcome
14th February – 18th February 2022	**Learning Unit 1 & 2**	Database Systems & Data Models (Part a)
21st February- 25th February 2022	**Learning Unit 3**	Data Models (Part b)
28th February 4th March 2022	**Learning Unit 4**	The Relational Database Model (Part a)
7th March – 11th March 2022	**Learning Unit 5**	The Relational Database Model (Part b)
14th March – 18th March 2022	**Learning Unit 6**	Entity Relationship (ER) Modeling
21st March- 25th March 2022	**Learning Unit 7**	Normalisation of Database Tables (Part a)
28th March- 1st April 2022	**Learning Unit 8**	Normalisation of Database Tables (Part b)
	Semester Test 1- **Thursday 31ST March 2022** **Online all day** **Time**: 08h00 - 09h30	

Week Beginning	Sessions	Topic / Outcome
2nd April – 10th April 2022 **RECESS 1**		
11th April - 15th April 2022	**Learning Unit 9**	Introduction to Structured Query Language (SQL) (Part a)
18th April – 22nd April 2022	**Learning Unit 10**	Introduction to Structured Query Language (SQL) (Part b)
25th April – 29th April 2022	**Learning Unit 11**	Advanced SQL (Part a)
2nd May – 6th May 2022	**Learning Unit 12**	Advanced SQL (Part b)
Semester Test 2- **Friday 6th May 2022** **Online all day**		
9th May – 13th May 2022	**Learning Unit 13**	Database Design (Part a)
16th May – 20th May 2022	**Learning Unit 14**	Database Design (Part b)
23rd May – 27th May 2022	**Revision of units**	**Online Revision class**
	Study week **28th May 2022– 31st June 2022**	
	1st June 2022 – 24th June 2022 **Examination**	

9. DETAILED MODULE LEARNING OUTCOMES AND ASSESSMENT CRITERIA

10.1 Unit learning outcome 1

Database Systems

In this chapter, you will learn:

- The difference between data and information
- What a database is, the various types of databases, and why they are valuable assets for decision making
- The importance of database design
- How modern databases evolved from file systems

- About flaws in file system data management
- The main components of the database system
- The main functions of a database management system (DBMS)

10.2 Unit learning outcome 2

Data Models (Part a)

In this chapter, you will learn:

- About data modeling and why data models are important
- About the basic data-modeling building blocks
- What business rules are and how they influence database design

10.3 Unit learning outcome 3

Data Models (Part b)

In this chapter, you will learn:

- How the major data models evolved
- About emerging alternative data models and the needs they fulfill
- How data models can be classified by their level of abstraction

10.4 Unit learning outcome 4

The Relational Database Model (Part a)

In this chapter, you will learn:

- That the relational database model offers a logical view of data
- About the relational model's basic component: relations
- That relations are logical constructs composed of rows (tuples) and columns (attributes)

10.5 Unit learning outcome 5

The Relational Database Model (Part b)

In this chapter, you will learn:

- That relations are implemented as tables in a relational DBMS
- About relational database operators, the data dictionary, and the system catalog
- How data redundancy is handled in the relational database model
- Why indexing is important

10.6 Unit learning outcome 6

Entity Relationship (ER) Modeling

In this chapter, you will learn:

- The main characteristics of entity relationship components
- How relationships between entities are defined, refined, and incorporated into the database design process
- How ERD components affect database design and implementation
- That real-world database design often requires the reconciliation of conflicting goals

10.7 Unit learning outcome 7

Normalisation of Database Tables (Part a)

In this chapter, you will learn:

- What normalization is and what role it plays in the database design process
- About the normal forms 1NF, 2NF, 3NF, BCNF, and 4NF
- How normal forms can be transformed from lower normal forms to higher normal forms

10.8 Unit learning outcome 8

Normalisation of Database Tables (Part b)

In this chapter, you will learn:

- That normalization and ER modeling are used concurrently to produce a good database design
- That some situations require denormalization to generate information efficiently

10.9 Unit learning outcome 9

Introduction to Structured Query Language (SQL) (Part a)

In this chapter, you will learn:

- The basic commands and functions of SQL
- How to use SQL for data administration (to create tables and indexes)

10.10 Unit learning outcome 10

Introduction to Structured Query Language (SQL) (Part b)

In this chapter, you will learn:

- How to use SQL for data manipulation (to add, modify, delete, and retrieve data)
- How to use SQL to query a database for useful information

10.11 Unit learning outcome 11

Advanced SQL (Part a)

In this chapter, you will learn:

- How to use the advanced SQL JOIN operator syntax
- About the different types of subqueries and correlated queries
- How to use SQL functions to manipulate dates, strings, and other data
- About the relational set operators UNION, UNION ALL, INTERSECT, and MINUS

10.12 Unit learning outcome 12

Advanced SQL (Part b)

In this chapter, you will learn:

- How to create and use views and updatable views
- How to create and use triggers and stored procedures
- How to create embedded SQL

10.13 Unit learning outcome 13

Database Design (Part a)

In this chapter, you will learn:

- That a sound database design is the foundation for a successful information system, and that the database design must reflect the information system of which the database is a part
- That successful information systems are developed within a framework known as the Systems Development Life Cycle (SDLC)

10.14 Unit learning outcome 14

Database Design (Part b)

In this chapter, you will learn:

- That within the information system, the most successful databases are subject to frequent evaluation and revision within a framework known as the Database Life Cycle (DBLC)
- How to conduct evaluation and revision within the SDLC and DBLC frameworks
- About database design strategies: top-down versus bottom-up design and centralized versus decentralized design

10. LIBRARY

The UJ Library (Auckland Park Bunting Road Campus)

Tel: (011) 559-2637

Times:

APB	Mon. - Thurs.: 07:30 – 21:00 Fri.: 07:30 – 18:00 Sat.: 08:00 – 15:00	Mon. - Thurs.: 07:30 – 18:00 Fri.: 07:30 –- 16:00 Sat.: 08:00 – 15:00	Mon. - Fri.: 07:30 – 16:00 Sat. (Jul): 08:00 – 13:00 Sat. (Dec): Closed Sat. (Jan. until 1st years register): 08:00 – 13:00
APK	Mon. - Fri.: 07:00 – 22:00 Sat.: 08:30 – 15:00	Mon.- Fri.: 07:00 – 22:00 Sat.: 08:30 – 15:00	Mon. - Fri.: 07:00 – 18:00 Sat. (Jul): 08:30 – 13:00 Sat. (Dec): Closed Sat. (Jan. until 1st years register): 08:30 – 13:00
DFC	Mon. - Thurs.: 07:30 – 21:00 Fri.: 07:30 – 17:00 Sat.: 08:00 – 15:00	Mon. - Thurs.: 07:30 – 18:00 Fri.: 07:30 – 16:00 Sat.: 08:00 – 15:00	Mon. - Fri. : 07:30 – 16:00 Sat. (Jul): 08:00 – 13:00 Sat. (Dec): Closed Sat. (Jan. until 1st years register): 08:00 – 13:00

11. SECRETARY DETAILS

The Department of Business Information Technology Secretary Office: G Purple 4.
Telephone: (011) 559-1216
Fax: (011) 559-1239
Email: sarah-janet@uj.ac.za

Enquiries concerning your registration or any other aspect of administration (e.g. exemption for a subject, academic record, etc.) must be addressed to Faculty Administration in A Block.

12. DISHONESTY AND PLAGIARISM

Dishonesty and plagiarism will not be tolerated. The University and the Faculty view the issue of plagiarism in a serious light. Evidence of plagiarism or dishonesty will be dealt with according to the University's and/or Faculty's Regulations.

The issue of plagiarism as referred to in the Faculty Guidelines for Ethics in Research:

Plagiarism is to:

- present the ideas, words or results of another person as your own, without acknowledging

the original author;

- use the ideas or words of another person without giving due credit to that person or source;
- use sentences, paragraphs or parts of articles and books without quotation marks and/or appropriate acknowledgement;
- download sentences, paragraphs or sections of writings from the Internet and to use them without quotation marks and/or proper acknowledgement;
- use another person's direct words without quotation marks, even when you acknowledge the source;
- use ideas without making them properly your own, even though you might have acknowledged the original source;
- formulate your words so closely to those of the original author that it is obvious that you could not have written them without having had the source next to you, i.e. your paraphrasing of the author's words is too close to the original author's use of the words, even if you did acknowledge your source.

Source: Booth, et al. and Schuklenk

If you use the words and ideas of other people, their words must be clearly indicated in quotation marks and used correctly, and their source indicated to avoid being guilty of plagiarism. No copying of textbooks is allowed.

Plagiarism is wrong because:

- It is theft of intellectual property.
- The person (plagiarist) lies about the contribution made to the project.
- The person (plagiarist) cannot give a true account of how the research was carried out.

Source: Udo Schuklenk (University of the Witwatersrand)

Benefits to be derived from consciously avoiding plagiarism:

By deliberately avoiding plagiarism, learners learn:

- the value of doing original work;
- to develop professional skills such as doing research, giving attention to detail and analysing arguments;
- to act with honesty and integrity in their professional lives; and
- to write professionally and engage in debate.

Source: Faculty of Law, the University of the Witwatersrand

13. GRIEVANCE PROCEDURE

Learners must consult with their lecturer if they experience any problems. Should the matter not be resolved, learners must complete a grievance application form **(See Appendix C)** and submit it to the departmental secretary.

14. THE ISSUE OF 'SCOPE'

Learners are advised that they should not solicit information from the lecturer (such as the pager number, or specific slides or notes) which may give clear direction as to where Semester Test 1, or Semester Test 2, or the Examination will be derived from. These mentioned assessments are set in such manner as to generally (and not specifically) include all relevant study material, books (or relevant chapters in books), and lecture notes/slides, tutorial material and or any other material deemed necessary by the lecturer. The lecturer will not therefore give 'scope' to learners as the meaning suggested above refers. Should learners ask about 'scope', (*I strongly discourage this*) the lecturer **will** respond appropriately with the following, "***read and prepare from all what has been covered in class***" or alternatively "***read section 15 of your Study/Learners Guide***".

15. IMPORTANT DATES FOR 2022

The following dates are important dates for 2022:

Date	
14 February	Last day to cancel 1st semester subjects with 100% refund
30 March	Last day to cancel 1st semester subjects with 50% refund
31 July	Last day to cancel 2nd semester subject with 100% refund
31 July	Last day to cancel year subjects with 50% refund

Appendix A - Application To Write Sick Test

UNIVERSITY OF JOHANNESBURG

DEPARTMENT OF
APPLIED INFORMATION SYSTEMS

Application for Deferred Test

UNIVERSITY OF JOHANNESBURG

NB THE FINAL DECISION AS TO WHETHER THE STUDENT IS/WAS ABLE TO WRITE A TEST/EXAMINATION RESTS WITH THE UNIVERSITY.

APPLICATION FOR DEFERRED (AEGROTAT) TEST(S)/EXAMINATION(S)

☞ APPLICATION(S) FOR DEFERRED (AEGROTAT) TEST(S) MUST BE **SUBMITTED** TO THE **RELEVANT** LECTURER,
☞☞ AND APPLICATIONS FOR DEFERRED (AEGROTAT) EXAMINATION(S) TO THE HEAD: FACULTY ADMINISTRATION IN THE OFFICE OF THE DEAN.

SECTION 1 TO BE COMPLETED BY THE STUDENT

1.1 INITIALS AND SURNAME: _____

1.2 TITLE (MARK WITH AN X): MR ☐ MRS ☐ MS ☐ MISS ☐ OTHER ☐

1.3 STUDENT NUMBER: ☐☐☐☐☐☐☐☐☐☐☐☐☐

1.4 NAME OF QUALIFICATION: _____

1.5 TELEPHONE NUMBER: _____ (AREA CODE) ☐☐☐☐☐☐☐☐☐☐

1.6 ADDRESS DURING STUDIES: _____

POSTCODE: ☐☐☐☐

1.7 COURSE(S) AND DATE(S) OF TEST(S)/EXAMINATION(S):

COURSE	DATE	COURSE	DATE	COURSE	DATE

DATE OF APPLICATION: _____ SIGNATURE OF STUDENT: _____

SECTION 2 TO BE COMPLETED BY A MEDICAL PRACTITIONER

2.1 INITIALS AND SURNAME: DR _____

2.2 REGISTERED PRACTICE/PROFESSIONAL COUNCIL NUMBER: _____

2.3 TELEPHONE NUMBER: _____ (AREA CODE) ☐☐☐☐☐☐☐☐☐☐

2.4 I HEREBY CONFIRM

(a) that I examined the abovementioned patient on _____ (date) ; and

(b) that the following diagnosis was made: _____ .

☞ MARK APPROPRIATE BLOCK WITH AN X

(c) ☐ I am convinced that the patient **is/was not able** to write test(s)/exam(s) on _____ (date(s))

OR

☐ I cannot, with certainty, say that the patient **is/was not able** to write test(s)/exam(s) on _____ (date(s))

☞☞ **YOU ARE KINDLY REQUESTED TO PLACE AN OFFICIAL STAMP OF YOUR MEDICAL PRACTICE ON THE FORM OR TO ATTACH A LETTERHEAD OF THE MEDICAL PRACTICE WITH YOUR SIGNATURE THEREON. YOUR COOPERATION IS GREATLY APPRECIATED.**

_____ SIGNATURE OF MEDICAL PRACTITIONER

_____ DATE

SECTION 3 TO BE COMPLETED BY THE DEAN OR HIS/HER APPOINTEE

APPROVED ☐ REJECTED ☐ (MARK WITH AN X))

_____ SIGNATURE OF DEAN

_____ DATE

[SIEKTE-EKS-VORM-E]

AFRIKAANS OP KEERSY

Appendix B – Assignment Declaration Form

DEPARTMENT OF

BUSINESS INFORMATION TECHNOLOGY

Declaration on Submission of Assignments for (Subject)

I _____ (Full names and surname) with:

Student number: _____

ID number: _____

hereby declare that this assignment entitled:

_____

_____

_____

_____

is my own work, and had not been published, even partially, anywhere else by anyone else except where I explicitly indicate otherwise.

- I understand that plagiarism means presenting the ideas and words of someone else as my own, without appropriate recognition of the source.
- I have fully acknowledged all words, ideas and results from other sources that I have used in this assignment through a generally accepted style of quotes, references and bibliography.
- I am aware that the university views plagiarism as a serious offence punishable by a disciplinary committee.
- I declare that not more than 10% of this assignment is directly quoted from any other published source, and that all sources used in this assignment are listed in the references at the end of the assignment.

_____ _____

Appendix B – Assignment Declaration Form

SIGNATURE DATE

Telephone numbers: Home: _____

Work: _____

Cell: _____

E-mail address: _____

Appendix C – Grievance Form

DEPARTMENT OF
BUSINESS INFORMATION TECHNOLOGY

Appointment with Subject Lecturer

DATE:……TIME OF APPOINTMENT:……..

(Secretary to complete)

NAME OF STUDENT:……

STUDENT NUMBER:……..

CONTACT NUMBER……..

PROGRAMME:……

SUBJECT / MODULE……..

LECTURER……...

NATURE OF THE ISSUE TO BE DISCUSSED (student must disclose full details and attach documentary proof where necessary)

……

…….....

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.....

.....

SIGNATURE OF STUDENT:……DATE:……..

Appendix C – Grievance Form

RESOLUTION: (How was the issue resolved? Lecturer must complete and return the form for filing)

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SIGNATURE OF LECTURER:……DATE…….....