

# ICT394

## Teaching Period: TSA 2024

**Unit coordinator: Dr. Florence Mwagwabi**

### Acknowledgement of Country

We acknowledge that Murdoch University is situated on the lands of the Whadjuk and Binjareb Noongar people. We pay our respects to their enduring and dynamic culture and the leadership of Noongar elders past and present. The *boodjar* (country) on which Murdoch University is located has, for thousands of years, been a place of learning. We at Murdoch University are proud to continue this long tradition.

This unit was originally written by Danny Toohey, June 2015. Revised by Florence Mwagwabi, 2022, 2023

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# 1 Unit information

Welcome to: **ICT394**

## **Business Intelligence Application Development**

### 1.1 Unit Overview

Business Intelligence (BI) has become a focus of organisations wishing to make more effective use of their data resource. This unit examines both the theoretical and practical aspects of BI, from discovery, inventory, extraction and transformation of data sources, through the common approaches to data modelling and analysis, to management reporting environments (MRE). The practical component of this unit will involve students creating a data warehouse, engage in data modelling and creating a functioning MRE. This will involve using a range of real-world data, making decisions about which data to procure and employing BI tools that are commonly used in the industry.

### 1.2 Learning outcomes

This unit enables you to demonstrate your achievement of the following unit learning outcomes.

Unit Learning Outcomes
1. Evaluate and determine which common data sources are most suited for Business Intelligence in organizational contexts.
2. Demonstrate practical skills in applying the processes associated with extraction, transformation and loading (ETL) of organisational data.
3. Design and implement a simple data warehouse environment.
4. Determine and create the most appropriate visualisation to communicate a particular analysis.
5. Demonstrate proficiency at working collaboratively to design data models and create a functional self-service Business Intelligence environment to a given specification.

### 1.3 Graduate attributes

This unit will contribute to the development of the following [Graduate Attributes](#):

- Communication
- Critical and creative thinking
- Social interaction
- Independent and lifelong learning
- Ethics
- In-depth knowledge of a field of study

#### 1.3.1 Skills Framework for the Information Age (SFIA) skills developed in the unit

The Skills Framework for the Information Age (SFIA) Framework enables the use of a common language to describe the various skill that exist in the information technology realm, and the levels at which those skills are exercised. For more detail regarding the framework, see: <http://www.sfia-online.org>

**This unit addresses the following SFIA Skills:**

Sub Category	Skill	Code	Level
Information Strategy	Information Analysis	INAN	5
Technical Strategy and Planning	Data Management	DATM	5
Systems Development	Data Analysis	DTAN	5
Systems Development	Database/repository design	DBDS	5

This unit will assist in preparing students for a number of common ICT roles, including:

- Business Analyst
- Systems Analyst
- Analyst Programmer

See: <https://www.acs.org.au/insightsandpublications/reports-publications/ict-skills-whitepaper.html>

## 1.4 General guidance and requirements

Please refer to Support & Advice via [myMurdoch](#) for all the information you need for your studies.

This includes:

- [Student admin](#), [Exams](#) and [Essentials](#), including [Policies](#) (refer to Assessment Policy and others), [Key dates](#), [Complaints and appeals](#)
- [Learning and study](#) support, including information about Academic Integrity and Murdoch Academic Passport
- [Health and wellbeing](#) information, including Accessibility services, Medical and counselling services, Aboriginal and Torres Strait Islander support, and Sexuality, sex and gender diversity support

## 2 Contact details

### 2.1 Unit coordinator

<b>Name:</b>	<b>Dr. Florence Mwagwabi</b>
School:	Information Technology
Campus:	Murdoch University (Singapore)
Email:	F.Mwagwabi@murdoch.edu.au
Phone:	+65 6733 7137

### 2.2 Teaching team

You will be notified who your teaching team is at the beginning of the teaching period. The teaching team member will provide you with their contact details.

<b>Name:</b>	<b>Dr. Florence Mwagwabi</b>
Role:	Unit Coordinator, Lecturer
Campus:	Murdoch University (Singapore)
Email:	F.Mwagwabi@murdoch.edu.au
<b>Name:</b>	<b>Mr Koh Choon Chye</b>
Role:	Lecturer
Campus:	Kaplan
Email:	<a href="mailto:Choonchye.koh@kaplan.com">Choonchye.koh@kaplan.com</a>

<b>Name:</b>	
Role:	
Campus:	
Email:	
Phone:	

## 3 How to study this unit

### 3.1 Approach to learning

#### 3.1.1 Learning approach underpinning unit

The unit material is divided into a number of topics roughly corresponding to teaching sessions. In general, however, the unit is based around the three primary aspects of BI, data, analysis and presentation.

#### 3.1.2 Unit changes in response to student feedback

Student feedback about ICT394 is welcomed. If you wish to provide feedback, please do so at any time. In addition, you will be provided with a formal opportunity to do so in the unit survey towards the end of semester.

The unit was offered at the Murdoch campus for the first time in 2016, and while the feedback from students was quite positive, there was a request that students be given an opportunity to perform a smaller analysis task mid-way through the unit so they could get some feedback prior to the completion of their major project. As a result of this, the following changes have been made over the past few years:

- Reduction of the online quiz component from 20% of the final mark to 10%
- Some minor adjustments to the order of the topics to give a more thorough overview earlier in the unit
- One of the things students in the first and subsequent iterations of the unit found useful was exposure to both Microsoft's Power BI Desktop and Tableau. I intend to continue with this, but will also, if time allows, include Python or R in future.
- Students have asked for more time between assignment 1 and two. This is implemented from January 2024.

### 3.2 Learning activities & requirements

#### 3.2.1 Overall expectations

There are readings for each topic, and you are expected to have obtained and read them prior to the workshop, answer questions in the weekly quiz submission, and to seek clarification from your tutor as needed.

#### 3.2.2 Learning activities and details

The approach to learning in this unit involves you exploring and deepening your understanding of business intelligence and analytics (BI&A) in organisations and how it is used for management decision-making. **The lectures are pre-recorded**, and other theory material including readings and case studies will be delivered online. Tutorial sessions will address issues raised in the lectures, readings and case studies. Computer labs will build on knowledge developed in ICT285 Databases, focussing on the data warehousing process and developing skills in the use of a range of analytics and presentation tools, and visualisation techniques.

### 3.3 Suggested time commitment

As this is a 3-credit point unit, there is an expectation that over the course of the teaching period you will spend somewhere in the region of 150 hours working on this unit. This will generally equate to an average of around 10 hours per week inclusive of class time.

## 4 Unit Schedule

See myMurdoch Learning for details of all learning activities and assessments. This timetable will help you to plan your study over the semester. However, it is only a rough guide to our coverage of the unit material.

Topic	Topic
1.	What is Business Intelligence
2.	BI Lifecycle
3.	Data Warehousing
4.	Data Warehouse Design
5.	Data Warehouse Implementation
6.	OLAP
7.	Business Analytics
8.	Data Mining
9.	Introduction to Data Visualisation
10.	Effective Visualisation Design
11.	Visualisation best practice
12.	Review and Revision



## 5 Assessments

Assessment for this unit is conducted in accordance with the [Assessment Policy](#).

### 5.1 Assessment summary

Assessment Name	Description	Unit Learning Outcomes	Weight %	Individual / Group	Due Date and Time
Design Exercise	Individual data warehouse design assignment	1 and 3	20%	Individual	Week 6
Topic Submissions	One online submission for each session (6 in total). Best 5 submissions will count.	1-5	10%	Individual	After each Teaching Session
Major Project	Students will work collaboratively to create a fully functional Business Intelligence environment	2, 3, 4, 5	30%	Group	Week 12
Final Examination	The exam will address the theoretical components of the unit. Closed Book.	1-5	40%	Individual	Assessment period

### 5.2 Assessment information

Assessment in this unit will involve a mixture of individual and group tasks. Feedback will be provided for all assessment components, including ongoing worksheets in either written or verbal form.

#### 5.2.1 Assessment 1 - Design Exercise

##### ASSESSMENT DESCRIPTION

Students will design and implement a data warehouse from one or more case studies. Design Exercise (20%) is an individual assignment that gives students an opportunity to create a data warehouse. Students are required to work with common data sources that exist in organisations for BI applications and evaluate which ones are most appropriate for answering specific BI questions and decision making.

##### GUIDELINES for SUCCESS

See “What you have to do” on the Assignment document.

##### HOW TO SUBMIT

Please submit a single word document (or similar, e.g., pdf is acceptable) using the link in Moodle.

You will **need to submit a single word document** that includes the written answers, the data model and related tasks (you may be required to submit the data files separately.); the SQL statements, and Screen shot of the design you have created for Task 3 (please do not submit your visio file, or whatever file you use, just a screen shot, copied and pasted into a word document please).

**HOW IT IS ASSESSED** (summary below, see Assignment document for details)

You will be assessed on these key criteria: ULO 1,2. This assessment addresses the following Unit Learning Outcomes:

1. Evaluate and determine which common data sources are most suited for Business Intelligence in organizational contexts.
2. Demonstrate practical skills in applying the processes associated with extraction, transformation and loading (ETL) of organisational data.
3. Design and implement a simple data warehouse environment.

## FEEDBACK FOR LEARNING

Feedback will be provided together with your assessment outcome will be provided to you via LMS.

## FURTHER DETAILS

See myMurdoch Learning for further details, such as instructions, communication, resources, guides, exemplars and a descriptive rubric assessment tool.

### 5.2.2 Assessment 2 - Major Project

#### ASSESSMENT DESCRIPTION

Group Project (30%)- in groups of 4 to 5, students are given the opportunity to engage in the entire process of BI implementation ending in the development of an interactive BI a management reporting environment (MRE). This involves substantive work from students including formulating BI questions to support specific business decisions, make a judgement of where to procure appropriate data, evaluation of the datasets for relevance to the BI question, demonstration of practical skills in assessing and choosing suitable ETL techniques, comparison and selection of appropriate data modelling and analytics techniques and ultimately the design and implementation of a functional BI environment. The students must also demonstrate the ability to interpret the data into business outcomes, both in a written report and as a group presentation.

Students in the group will have to negotiate the division of tasks. Students are expected to form their own groups and inform the Unit Coordinator by the date specified in LMS. Students who do not do so by that date will be randomly allocated to a group by the Unit Coordinator. Marks will be allocated equally to all members of the group. If there is conflict within the group, the Unit Coordinator should be informed without delay. All efforts will be made to resolve the conflict. If the conflict is not immediately resolved, the Unit Coordinator will decide on a resolution in consultation with the group members.

#### GUIDELINES for SUCCESS

**The project has two parts:** a written report, and a presentation.

Marks will be allocated for the various sections of the project as listed in the Assignment document.

#### HOW TO SUBMIT

Unless otherwise specified, assessments are to be submitted electronically via the ICT394 LMS site using the Assignment course tool. So your work doesn't get mixed up with that of others make sure that each piece of assessment includes your student number and the name of the assignment. It is your responsibility to **keep a copy of any work handed in for assessment purposes**. It is recommended that you keep both a hard copy and an electronic copy.

Assessments that are not received by the due date will be regarded as late unless an extension has been granted by the unit coordinator. Applications for extensions should be made as soon as a problem is experienced. Late submission will be penalized at a rate of five percent of the total marks available for the assignment per day (or part thereof). **No submission will be accepted more than 10 days after the due date, as assignment return will have begun.**

#### HOW IT IS ASSESSED (summary)

You will be assessed on these key criteria:

**The report is worth 70%** of the marks for this project and will be allocated as below.

**The report you create should include** the following:

- Written report
- Visualizations
- Data modelling
- Evidence of ETL
- Dataset and references
- Data dictionary

**The presentation** is worth 30% of the mark for the project. In the final week of the term, each group will make a 15–20-minute presentation to the class. See marking guide in the Assignment document.

The assessment includes a moderation process to ensure reliable, just, and fair outcomes. Your assessment outcome will be provided to you via LMS.

### **FEEDBACK FOR LEARNING**

Feedback will be provided together with your assessment outcome will be provided to you via LMS.

### **FURTHER DETAILS**

See myMurdoch Learning for further details, such as instructions, communication, resources, guides, exemplars and a descriptive rubric assessment tool.

## **5.2.3 Assessment 3 - Topic Submissions (LMS Quiz)**

### **ASSESSMENT DESCRIPTION**

There will be an online quiz submission **at the end of each topic**. Topic Quizzes (10%) place the expectation of regular, continuous engagement and improvement in a pressurised environment. The quizzes involve a mixture of MCQs and short answer questions or may require the student to upload a file for assessment. Students must submit an original summation of core items covered each week addressing both theoretical and practical aspects. The best 10 (out of 12) submissions will count toward the 10% allocated to this assessment component.

### **GUIDELINES for SUCCESS**

Complete the task immediately after the session. The quiz assumes you have completed all work for the relevant Topic(s). You will need to have the completed the relevant Lab exercise available to you to complete the quiz.

### **HOW TO SUBMIT**

LMS Quiz – available **at the end of each topic**.

### **HOW IT IS ASSESSED** (summary)

You will be assessed on these key criteria:

- Learning outcomes 1-5
- One online submission for each session (6 in total). Best 5 submissions will count.

The assessment includes a moderation process to ensure reliable, just, and fair outcomes. Your assessment outcome will be provided to you via LMS.

### **FEEDBACK FOR LEARNING**

Feedback will be provided after the quiz is closed, via LMS.

### **FURTHER DETAILS**

See myMurdoch Learning for further details, such as instructions, communication, resources, guides, exemplars and a descriptive rubric assessment tool.

## 5.3 Academic integrity

Murdoch University expects students and staff to pursue the highest standards of integrity in all academic activity. Academic integrity involves behaving ethically and honestly in scholarship and relies on respect for others' ideas through proper acknowledgement and referencing of publications.

Academic misconduct is treated seriously, and penalties may apply.

More information about academic integrity can be found at <https://goto.murdoch.edu.au/learningstudy>. To help you learn about academic integrity practices, all students are required to complete the [Murdoch Academic Passport \(MAP100\)](#). Please also note the [library citation guide](#).

Murdoch University makes use of content matching software to detect submitted work that is not original. When you submit an assessment to myMurdoch Learning, it is checked by this software. Your Unit Coordinator may apply other processes to verify that your submitted assessment is your own work.

In this unit, we undertake these practices to assure academic integrity: Your Unit Coordinators may use software called Urkund when viewing work that you submit. Urkund is a pattern-matching system designed to compare work submitted by students with other sources from the internet, journals/periodicals, and previous submissions. Its primary purpose is to detect any submitted work that is not original and provide a thorough comparison between the submitted document and the original sources.

## 5.4 Extensions and late submissions

In this unit, extensions and late submissions follow these requirements: Assessments that are not received by the due date will be regarded as late unless an extension has been granted by the unit coordinator. Applications for extensions should be made as soon as a problem is experienced. Late submission will be penalised at a rate of five percent of the total marks available for the assignment per day (or part thereof). **No submission will be accepted more than 10 days after the due date and submissions via LMS will be closed. Emailed assignments will not be marked.**

This unit follows Murdoch policies and procedures with regards to extensions and late submissions, supplementary and deferred assessment.

Students who feel that their disability, medical condition or disability caring responsibilities may impact on their capacity meet assessment submission are strongly advised to visit [Access and Inclusion](#) as early as possible to discuss potential needs and assistance.

## 5.5 Determination of the final grade

Refer to Reporting of Results in the [Assessment Policy](#) for information about marks and grades.

**In order to pass the unit you must:**

- Have an aggregate score for the combined assessment of 50% or better
- Submit all pieces of assessment and sit the final examination
- Achieve a satisfactory performance in the final examination. A satisfactory performance is normally considered to be 50% or higher

The grade is determined in this way because in order to be considered competent in this subject, it is essential that you can demonstrate both practical skills and theoretical knowledge. These components are assessed in different parts of the unit.

See Section 7 of the Assessment Policy regarding grades:

<http://www.murdoch.edu.au/index/policies/index?Filter=assessment>

## 6 Learning resources

### 6.1 All learning resources

Your learning resources and any updates are provided through myMurdoch Learning (LMS) in the [myMurdoch portal](#).

Learning resources within the myMurdoch Learning online environment for this unit will be

1. integrated within the sections and learning activities and/or
2. through tools such as:
  - My Unit Readings
  - Collaborate
  - Echo360
  - PebblePad

The specific types of learning resources that we use include

### 6.2 Essential learning resources

Essential to success in this unit are these learning resources:

To undertake study in this unit, you will need:

**Essential Textbook:** There is no textbook for this unit. All required readings will be provided electronically.

**Required Software:** To complete the practical labs for this unit, the following Software are required.

- Power BI
- PuTTY
- VPN – Cisco AnyConnect (required to access SQL via Murdoch's rhea server)
- Oracle SQL Developer

**All the above listed required Software are installed in Kaplan Lab computers.**

The Online Unit (i.e. the ICT394 LMS site) can be accessed from your MyMurdoch page. Copies of the unit materials will be made available on a week-by-week basis from the ICT394 LMS site.

There are no previous exam papers available, but you will be provided with information about the exam format and sample questions during the semester.

The following will be provided during the teaching period:

- lecture slides
- lecture recordings
- digital media
- workshop handouts
- laboratory instructions/workbooks
- print and electronic library material
- Internet articles

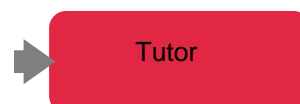
Other resources and further recommended resources are in our myMurdoch Learning.

## 7 Academic Advice and Student Support

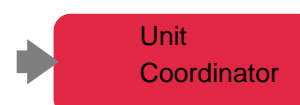
**Use this flowchart or seek direct assistance from Student Support Services or MyMurdochAdvice.**

### **If you have...?**

- Questions about content covered in tutorials or practical sessions.
- General questions about completing assessments.
- Concerns about another student or your learning needs.
- Positive and constructive feedback.



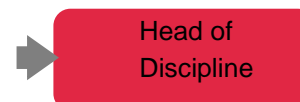
- 
- Questions about unit content, assessments, attendance or tutorial times.
  - Questions on marked assessments.
  - Academic issues with your learning in this unit.
  - Positive and constructive feedback.



- 
- Academic issues that haven't been adequately addressed by the unit coordinator.
  - Academic issues relating to progression through your degree, withdrawal from a unit or intermission.
  - Positive and constructive feedback.



- 
- Academic or other issues that haven't been adequately addressed by your academic chair or you aren't comfortable discussing with your academic chair.
  - Request to re-mark an assessment.
  - Complaints or appeals relating to your studies that haven't been adequately addressed. Visit Complaints and Appeals for more advice.
  - Positive and constructive feedback.



To further escalate an appeal or complaint, contact the Dean Learning and Teaching and/or see Complaints and Appeals for formal appeals procedures.

**STUDENT SUPPORT SERVICES:** <https://goto.murdoch.edu.au/supportservices>

**LEARNING AND STUDY SUPPORT:** <https://goto.murdoch.edu.au/learningstudy>

**MYMURDOCH ADVICE:** <https://goto.murdoch.edu.au/mymurdochadvice>

**COMPLAINTS AND APPEALS:** <https://goto.murdoch.edu.au/ComplaintsAppeals>

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