COIT20260 *Cloud Computing and Internet of Things for Smarter Applications*
Term 2 - 2023

Profile information current as at 11/04/2024 08:20 am

General Information

Overview

Emerging technologies, such as cloud computing and the Internet of Things (IoT), enable you to rapidly design, develop and deploy smart applications. In this unit, you are introduced to the software, devices, and techniques supporting these technologies. You will learn the fundamentals of cloud computing as well as various cloud environments and services, such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). You will use a Platform as a Service (PaaS) cloud environment, gaining practical experience in designing, developing and deploying smarter cloud-based applications.

Details

Career Level: *Postgraduate*
Unit Level: *Level 9*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites

Pre-requisite units: COIT20245 Introduction to Programming and COIT20246 ICT Services Management
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the Assessment Policy and Procedure (Higher Education Coursework).

Offerings For Term 2 - 2023

- Brisbane
- Melbourne
- Online
- Sydney

Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website

This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.

Class and Assessment Overview

Recommended Student Time Commitment

Each 6-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

Regional Campuses
Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

Metropolitan Campuses
Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Written Assessment**
Weighting: 20%
2. **Group Work**
Weighting: 30%
3. **Project (applied)**
Weighting: 50%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the CQUniversity Policy site.
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Unit Coordinator's reflection

Feedback

There is a heavy focus on IBM Cloud, so students do not get exposure to other widely used cloud computing environments

Recommendation

Investigate a pathway to integrate content related to AWS or Azure

Feedback from Reflection from Co-lecturer and Unit Coordinator

Feedback

Constant process change in IBM Cloud results in some laboratory instructions being out of date

Recommendation

The laboratory content will be reviewed at the start of every offering to ensure up-to-date instructions are provided

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Evaluate cloud computing concepts and IoT components for smart applications/systems development
2. Analyse the application of cloud computing and IoT technologies in different scenarios
3. Design and develop cloud based smart applications for business solutions
4. Deploy a smart application using cloud computing and IoT technologies.

The Australian Computer Society (ACS) recognises the Skills Framework for the Information Age (SFIA). SFIA is adopted by organisations, governments and individuals in many countries and provides a widely used and consistent definition of ICT skills. SFIA is increasingly being used when developing job descriptions and role profiles. ACS members can use the tool MySFIA to build a skills profile.
This unit contributes to the following workplace skills as defined by SFIA 7 (the SFIA code is included)

- Systems design (DESN)
- Systems integration and build (SINT)
- Programming/software development (PROG)
- Testing (TEST)
- Release and deployment (RELM)
- Application support (ASUP)
- Solution architecture (ARCH)
- IT infrastructure (ITOP)

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level • Introductory Level • Intermediate Level • Graduate Level ◦ Professional Level ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes			
	1	2	3	4

Assessment Tasks	Learning Outcomes			
	1	2	3	4
1 - Written Assessment - 20%	•	•		
2 - Group Work - 30%	•	•	•	
3 - Project (applied) - 50%			•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes			
	1	2	3	4
1 - Knowledge	◦	◦	◦	◦
2 - Communication	◦	◦		
3 - Cognitive, technical and creative skills	◦		◦	◦
4 - Research		◦		
5 - Self-management				◦
6 - Ethical and Professional Responsibility			◦	
7 - Leadership		◦		
8 - Aboriginal and Torres Strait Islander Cultures				

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes							
	1	2	3	4	5	6	7	8
1 - Written Assessment - 20%	◦	◦	◦					
2 - Group Work - 30%	◦	◦		◦			◦	
3 - Project (applied) - 50%	◦		◦		◦	◦		

Textbooks and Resources

Textbooks

COIT20260

Supplementary

Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS)
1st Edition (2014)

Authors: Kavis, MJ
Wiley US
Hoboken , NJ , USA
ISBN: 9781118617618
Binding: Paperback
COIT20260

Supplementary

Cloud Computing: Concepts, Technology & Architecture
1st edition (2013)
Authors: Erl, T., Mahmood, Z., and Puttini R.
Prentice Hall
USA
Binding: Hardcover
COIT20260

Supplementary

CompTIA Cloud+ Guide to Cloud Computing
Edition: 1st edn (2021)
Authors: West, J
Cengage Learning
Boston , MA , USA
ISBN: 9780357541395
Binding: Hardcover
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Supplementary

Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud
(2015)
Authors: Stallings, W
Pearson USA
Upper Saddle River , NJ , USA
ISBN: 9780134175393
Binding: Paperback
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Supplementary

The Internet of Things
1st Edition (2015)
Authors: Miller, M
Pearson
Upper Saddle River , NJ , USA
Binding: eBook

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Node.js and NODE-RED
- IBM Cloud CLI
- Eclipse Oxygen with IBM Cloud Tool
- Cloud Foundry Command Line Interface (CLI)
- An Azure supported Java Development Kit (JDK)
- An Eclipse IDE supporting Azure Toolkit and IBM cloud tool

Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

Teaching Contacts

Biplob Ray Unit Coordinator
b.ray@cqu.edu.au

Schedule

Week 1 - 10 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Cloud computing and modern networking	Chapter 1 and 2 from 'Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud 1st Edition, by William Stallings' and Azure Fundamentals Course	

Week 2 - 17 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Smart applications and modern networking	Chapter 1 and 2 from 'Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud 1st Edition, by William Stallings' and Azure Fundamentals Course and Azure Fundamentals Course	

Week 3 - 24 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Cloud technologies	Chapter 5 from 'Cloud Computing: Concepts, Technology & Architecture by Erl, T., Mahmood, Z., and Puttini R.' and Azure Fundamentals Course	

Week 4 - 31 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Cloud mechanisms	Chapter 7, 8 and 9 from 'Cloud Computing: Concepts, Technology & Architecture by Erl, T., Mahmood, Z., and Puttini R.' and https://cloud.ibm.com/docs/overview?topic=overview-whatis-platform	

Week 5 - 07 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
Cloud computing and virtualization	Chapter 7, 8 and 9 from 'Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud 1st Edition, by William Stallings' and AZ-204T00A-Educator-Resources-Developing-solutions-for-Microsoft-Azure and AWS Academy Cloud Developing	**Assignment 1 - Evaluation of Cloud Services** Due: Week 5 Friday (11 Aug 2023) 11:59 pm AEST

Vacation Week - 14 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
Enjoy the break.		

Week 6 - 21 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
Cloud Security	Chapter 6 and 10 from 'Cloud Computing: Concepts, Technology & Architecture by Erl, T., Mahmood, Z., and Puttini R.'	

Week 7 - 28 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic

Cloud security and architectures	Chapters 11 and 12 from 'Cloud Computing: Concepts, Technology & Architecture by Erl, T., Mahmood, Z., and Puttini R.'and AZ-500 Certification: Microsoft Azure Security Technologies	

Week 8 - 04 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
Cloud delivery model and cost metrics	Chapter 14 and 15 from 'Cloud Computing: Concepts, Technology & Architecture by Erl, T., Mahmood, Z., and Puttini R.' and Azure Learning resources: AZ-900T00	**Assignment 2 - Research Report** Due: Week 8 Friday (8 Sept 2023) 11:59 pm AEST

Week 9 - 11 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
Understanding the Internet of Things (IoT) and smart application	Chapter 14 from 'Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud 1st Edition, by William Stallings'	

Week 10 - 18 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
The IoT: architecture and implementation for cloud	Chapter 15 from 'Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud 1st Edition, by William Stallings'	

Week 11 - 25 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
A convergence of Cloud, IoT, and Bigdata	Chapters 1 and 4 from 'The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World by Miller, Michael' and Some slides are adopted from 'SG13 Regional Workshop for Africa on “ITU-T Standardization Challenges for Developing Countries Working for a Connected Africa” by Gyu Myoung Lee'	

Week 12 - 02 Oct 2023

Module/Topic	Chapter	Events and Submissions/Topic
Smart problems and smart businesses	Chapters 12, 14 and 15 from 'The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World by Miller, Michael	**Assignment 3 - Smart Application Development** Due: Week 12 Friday (6 Oct 2023) 11:59 pm AEST

Review/Exam Week - 09 Oct 2023

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 16 Oct 2023

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

Welcome to Term 2 2023! Unit Contact details are found on the unit page on Moodle (under "Information", top left corner). Contact me if you have any questions which are not suitable to be asked through the unit forums.

Have an enjoyable term!

Unit Coordinator - (T2, 2023, COIT20260- Cloud Computing and Internet of Things for Smarter Applications)

Dr. Biplob Ray (b.ray@cqu.edu.au)

Assessment Tasks

1 Assignment 1 - Evaluation of Cloud Services

Assessment Type
Written Assessment

Task Description
This is an **individual** assignment. In this assignment, you will write a report that will let you compare and contrast between two Platform as a Service (PaaS) cloud providers and their services. You are also required to create a simple application in each of the cloud services as part of your comparative exercise. The assignment requires you to:

1. identify a PaaS and IaaS cloud provider and investigate all the services it provides;
2. compare and contrast your chosen cloud provider and services with IBM Cloud services;
3. create a simple application in both of the cloud providers; and
4. prepare a report based on the given criteria in the assessment specification.

Detailed information about this assignment can be accessed from the Moodle unit website.

Assessment Due Date
Week 5 Friday (11 Aug 2023) 11:59 pm AEST
Online via Moodle

Return Date to Students
Week 6 Friday (25 Aug 2023)
Online via Moodle

Weighting
20%

Assessment Criteria
The students are assessed based on their:
1. knowledge about existing cloud providers;
2. ability to identify and evaluate available services of a cloud provider; and
3. analytical capability to compare and contrast between services of different service providers.
More detailed marking criteria can be accessed from the Moodle unit website.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
The assignment must be submitted online in .doc or .docx format as per submission guideline detailed in the assignment description and marking guide.

Learning Outcomes Assessed

- Evaluate cloud computing concepts and IoT components for smart applications/systems development
- Analyse the application of cloud computing and IoT technologies in different scenarios

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills

2 Assignment 2 - Research Report

Assessment Type
Group Work

Task Description
This is a **group** assignment and must be accomplished in a group of 3 members. The assignment requires you to select a topic from a given list and research on that topic. You should find scholarly articles (e.g. published journal articles, books, conference papers) and report current scientific developments relevant to the topic. The investigation should be done in a team environment which requires you to:

1. choose a topic from the given list based on the given instructions in the assessment specification;
2. research multiple scholarly resources to report the scientific developments relevant to the topic; and
3. prepare a report according to the given guidelines in the assessment specification.

Detailed information about this assignment can be accessed from the unit website in Moodle.

Assessment Due Date
Week 8 Friday (8 Sept 2023) 11:59 pm AEST
Online via Moodle

Return Date to Students
Week 10 Friday (22 Sept 2023)
Online via Moodle

Weighting
30%

Assessment Criteria
The students are assessed based on their:
1. research skills to locate and use quality scholarly articles relevant to their topic;
2. capability to understand and analyse scientific articles in depth;
3. quality and level of detail in the report; and
4. effective teamwork skills.
More detailed marking criteria can be accessed from the Moodle unit website.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
The assignment must be submitted online in .doc or .docx format as per submission guideline detailed in the assignment description and marking guide.

Learning Outcomes Assessed

- Evaluate cloud computing concepts and IoT components for smart applications/systems development
- Analyse the application of cloud computing and IoT technologies in different scenarios
- Design and develop cloud based smart applications for business solutions

Graduate Attributes

- Knowledge
- Communication
- Research
- Leadership

3 Assignment 3 - Smart Application Development

Assessment Type
Project (applied)

Task Description
In Assignment 3, you will continue working with the same group as your Assignment 2. In this assignment, you are required to analyse a given business case and issues within it and come up with a smart application that will address the identified issues. You will write a report to demonstrate the process you followed to create the smart application. The assignment requires you to:

1. analyse the given business case and identify issues associated with the business;
2. design a smart application based solution to address the identified issues;
3. develop and deploy the application in IBM Cloud; and
4. prepare a report (as per the instructions given in the assignment specification) to illustrate your activities during the smart application development.

Detailed information about this assignment can be accessed from the Moodle unit website.

Assessment Due Date
Week 12 Friday (6 Oct 2023) 11:59 pm AEST
Online via Moodle

Return Date to Students

On the date of certification of grades

Weighting
50%

Assessment Criteria
The students are assessed based on:
1. depth of analysis to identify the current and upcoming issues in the given business case;
2. level of appropriateness of the solution and its justification;
3. completeness of the development and deployment of the solution; and
4. quality and level of detail in the report.
More detailed marking criteria can be accessed from the Moodle unit website.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
The assignment must be submitted online in .doc or .docx format by each member of the group.

Learning Outcomes Assessed

- Design and develop cloud based smart applications for business solutions
- Deploy a smart application using cloud computing and IoT technologies.

Graduate Attributes

- Knowledge
- Cognitive, technical and creative skills
- Self-management
- Ethical and Professional Responsibility

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?

Be Honest
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

Seek Help
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

Produce Original Work
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem