



# **COIT13229 *Applied Distributed Systems***

## **Term 1 - 2020**

Profile information current as at 20/04/2024 06:30 am

All details in this unit profile for COIT13229 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

### Corrections

#### **Unit Profile Correction added on 24-04-20**

The end of term examination has now been changed to an alternate form of assessment. Please see your Moodle site for details of the assessment.

## General Information

### Overview

Many computer applications and services in use today are distributed systems: they have software running on multiple computers, communicating with each other across a network to achieve a common goal. In this unit you will examine the benefits and challenges of distributed systems versus centralised systems, and you will learn architectural design, inter-process communication and networking. You will explore the significant distributed system characteristics of scalability, heterogeneity, security and failure handling. You will implement these algorithms and techniques through laboratory activities and development of secure, reliable, client/server software applications that can perform concurrent operations across multiple computers in the Internet.

### Details

Career Level: *Undergraduate*

Unit Level: *Level 3*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

### Pre-requisites or Co-requisites

Pre-requisite: COIT11134

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 1 - 2020

- Brisbane
- Cairns
- Melbourne
- Online
- Rockhampton
- Sydney
- Townsville

### 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 Undergraduate 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: 25%

#### 2. **Written Assessment**

Weighting: 35%

#### 3. **Examination**

Weighting: 40%

### 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 Evaluation Report

##### Feedback

An improvement in learning resources is required.

##### Recommendation

Additional practice examples will be provided to aid in learning.

## Unit Learning Outcomes

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

1. Compare the benefits and challenges of distributed systems versus centralised systems
2. Design software components that can run in parallel and on multiple networked computers
3. Apply various distributed system algorithms and techniques to create practical distributed applications
4. Analyse the role of operating system services and file systems in creating distributed applications
5. Evaluate techniques for creating secure, reliable and efficient distributed systems.

Australian Computer Society (ACS) recognises the Skills Framework for the Information Age (SFIA). SFIA is in use in over 100 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 at

<https://www.acs.org.au/professionalrecognition/mysfia-b2c.html>

This unit contributes to the following workplace skills as defined by SFIA. The SFIA code is included:

- Systems Design (DESN)
- Systems Integration (SINT)
- Programming/Software Development (PROG),
- Database/Repository Design (DBDS)
- Testing (TEST)
- Network support (NTAS)
- Release and Deployment (RELM)
- Application Support (ASUP)

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
1 - Written Assessment - 25%	•	•	•		
2 - Written Assessment - 35%		•	•	•	
3 - Examination - 40%	•			•	•

## Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
1 - Communication	•	•	•	•	•
2 - Problem Solving	•	•	•	•	•
3 - Critical Thinking	•	•	•	•	•
4 - Information Literacy	•	•	•	•	•
5 - Team Work					
6 - Information Technology Competence	•	•	•	•	•
7 - Cross Cultural Competence					
8 - Ethical practice					
9 - Social Innovation					
10 - 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	9	10
1 - Written Assessment - 25%	•	•	•	•		•				
2 - Written Assessment - 35%	•	•	•	•		•				
3 - Examination - 40%	•	•	•	•		•				

## Textbooks and Resources

### Textbooks

COIT13229

#### Prescribed

#### Distributed Systems Concepts and Design

Edition: 5th (2012)

Authors: George Coulouris, Jean Dollimore, Tim Kindberg and Gordon Blair

Addison-Wesley

Boston , MA , USA

ISBN: 9780132143011

Binding: Other

#### Additional Textbook Information

Copies can be purchased at the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code)

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

#### You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Java SE 11
- NetBeans IDE 11

## Referencing Style

#### All submissions for this unit must use the referencing styles below:

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)
- [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Partha Gangavalli** Unit Coordinator

[p.gangavalli@cqu.edu.au](mailto:p.gangavalli@cqu.edu.au)

## Schedule

### Week 1 - 09 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
An Introduction to Distributed Systems	1 & 2	

### Week 2 - 16 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Interprocess Communication	4	

### Week 3 - 23 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Distributed Objects and Remote Invocation	5	

<b>Week 4 - 30 Mar 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Process and Thread Management - Operating System Support	7	
<b>Week 5 - 06 Apr 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Security in Distributed Systems	11	
<b>Vacation Week - 13 Apr 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Vacation		
<b>Week 6 - 20 Apr 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Web Services	9	<b>Assignment - 1</b> Due: Week 6 Friday (24 Apr 2020) 11:45 pm AEST
<b>Week 7 - 27 Apr 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Name Services	Chapter 13	
<b>Week 8 - 04 May 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Coordination and Agreement	15	
<b>Week 9 - 11 May 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Transactions and Concurrent Control	16	
<b>Week 10 - 18 May 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Distributed Transactions	17	
<b>Week 11 - 25 May 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Replication and Fault Tolerance	18	<b>Assignment - 2</b> Due: Week 11 Friday (29 May 2020) 11:45 pm AEST
<b>Week 12 - 01 Jun 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Mobile and Ubiquitous Computing	19	
<b>Review/Exam Week - 08 Jun 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
<b>Exam Week - 15 Jun 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>

## Term Specific Information

### Unit Coordinator

Mr Partha Gangavalli  
School of Engineering and Technology  
Central Queensland University  
Sydney

**Email:** [p.gangavalli@cqu.edu.au](mailto:p.gangavalli@cqu.edu.au)

## Assessment Tasks

### 1 Assignment - 1

#### Assessment Type

Written Assessment

#### Task Description

Your task for this assignment is to design, implement, test and document a client/server system which allows concurrent access to multiple clients. The purpose of this assignment is to assess your competency in Java TCP/UDP networking, multi-threading, and object serialization/de-serialization. This assignment task is to assess your skills in practicing the theoretical concepts learnt in Weeks 1 - 4. Further details are available on the unit website in the Assignment 1 Specification document.

#### Assessment Due Date

Week 6 Friday (24 Apr 2020) 11:45 pm AEST

Assignment-1 Due

#### Return Date to Students

Week 8 Friday (8 May 2020)

Assignment-1 Results Release

#### Weighting

25%

#### Assessment Criteria

1. Appropriate analysis and design of a software application using networking and client-server communication for the given problem
2. Implementation of the application using networking, multi-threading, and object serialization
3. Incorporation of concurrent multi-user access to the software application
4. Use of good programming techniques/practices
5. Rigorous testing of software application.

#### Referencing Style

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)
- [Harvard \(author-date\)](#)

#### Submission

Online

#### Submission Instructions

Submit one zip file containing all source code (.java) and the report (.doc) file using the Assignment submission link available on unit website. Do not submit the zipped project folder or compiled binaries(.class, .jar).

#### Learning Outcomes Assessed

- Compare the benefits and challenges of distributed systems versus centralised systems
- Design software components that can run in parallel and on multiple networked computers
- Apply various distributed system algorithms and techniques to create practical distributed applications

#### Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

### 2 Assignment - 2

#### Assessment Type

Written Assessment

#### Task Description

Your task for this assignment is to design, implement, test and document a *secure* client/server system which allows concurrent access to multiple clients. This assignment task is to assess your skills in practicing the theoretical concepts

learnt in Weeks 4 - 9. Further details are available on the unit website in the Assignment 2 Specification document.

**Assessment Due Date**

Week 11 Friday (29 May 2020) 11:45 pm AEST

**Return Date to Students**

Review/Exam Week Thursday (11 June 2020)

Assignment-2 Results Release

**Weighting**

35%

**Assessment Criteria**

1. Appropriate analysis and design of a software application using networking and client-server communication for the given problem
2. Implementation of the application using networking, multi-threading, and security
3. Incorporation of concurrent multi-user access to the software application
4. Use of good programming techniques/practices
5. Rigorous testing of software application.

**Referencing Style**

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)
- [Harvard \(author-date\)](#)

**Submission**

Online

**Submission Instructions**

Submit one zip file containing all source code (.java) and the report (.doc) file using the Assignment submission link available on unit website. Do not submit the zipped project folder or compiled binaries(.class, .jar).

**Learning Outcomes Assessed**

- Design software components that can run in parallel and on multiple networked computers
- Apply various distributed system algorithms and techniques to create practical distributed applications
- Analyse the role of operating system services and file systems in creating distributed applications

**Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

## Examination

**Outline**

Complete an invigilated examination.

**Date**

During the examination period at a CQUniversity examination centre.

**Weighting**

40%

**Length**

180 minutes

**Exam Conditions**

Open Book.

**Materials**

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

## 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