



# COIT20261 Network Routing and Switching

## Term 2 - 2024

Profile information current as at 29/07/2024 03:41 pm

All details in this unit profile for COIT20261 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.

## General Information

### Overview

This unit provides you with fundamental skills and knowledge in the design and operation of computer networks. It deals in-depth with the techniques described in current Internet protocols to forward data packets from source to destination through different types of networks. You will focus on the Transport and Internet layer functions with emphasis on IPv4 addressing as well as switching and routing technologies. An introduction to IPv6 and transition issues is included. The unit covers these functions in both Local Area Networks (LANs) and Wide Area Networks (WANs). The function of the key protocols in wireless networks are also discussed, ensuring a well-rounded grounding to enable easier adaptation to imminent significant developments such as the global adoption of IPv6 and the growing dominance of wireless networking in business and everyday life. Delivery of this comprehensive content is through a weekly lecture and tutorial which includes theory and some hands-on lab activity where available.

### 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

Prerequisite: COIT20246 Networking and Cyber Security Anti-requisite: COIT20229 Networking with TCI/IP.

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 - 2024

- Brisbane
- Melbourne
- Online
- Rockhampton
- 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. **Written Assessment**

Weighting: 30%

#### 3. **In-class Test(s)**

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 Student Feedback

**Feedback**

The lecture slides should be concise and well organised.

**Recommendation**

The lecture slides should be reviewed and updated.

#### Feedback from Feedback from Internship Hosts

**Feedback**

Students are lacking in hands-on experience.

**Recommendation**

Increase the practical activities with industry related tools, i.e., related to CCNA.

#### Feedback from Teaching Team

**Feedback**

The coverage of cutting-edge cloud technologies is lacking.

**Recommendation**

Increase the coverage of state-of-the-art cloud technologies, i.e., Microsoft Azure cloud platform.

## Unit Learning Outcomes

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

1. Apply your knowledge in Network Routing to solve problems in wired and wireless networks
2. Develop IP addressing plans for organisational networks
3. Analyse the application of wireless network technologies in different scenarios
4. Compare and contrast the protocols and standards in routing and switching
5. Evaluate the complexities involved in transitioning to new technologies such as IPv6.

The Australian Computer Society (ACS), the professional association for Australia's ICT sector, 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 8](#) (the SFIA code is included):

- Systems Design (DESN)
- Systems integration and build (SINT)
- Network Support (NTAS)
- Configuration Management (CFMG).

The National Initiative for Cybersecurity Education ([NICE](#)) Framework defines knowledge, skills and tasks needed to perform various cyber security roles. Developed by the National Institute of Standards and Technology (NIST), the NICE Framework is used by organisations to plan their workforce, including recruit into cyber security positions.

This unit helps prepare you for roles such as Systems Security Analyst, Network Operations Specialist and Systems Administrator, contributing to the following knowledge and skills:

- K0001 Knowledge of computer networking concepts and protocols, and network security methodologies.
- K0010 Knowledge of communication methods, principles, and concepts that support the network infrastructure.
- K0011 Knowledge of capabilities and applications of network equipment including routers, switches, bridges, servers, transmission media, and related hardware.
- K0029 Knowledge of organization's Local and Wide Area Network connections.
- K0061 Knowledge of how traffic flows across the network (e.g., Transmission Control Protocol [TCP] and Internet Protocol [IP], Open System Interconnection Model [OSI], Information Technology Infrastructure Library, current version [ITIL]).
- K0108 Knowledge of concepts, terminology, and operations of a wide range of communications media (computer and telephone networks, satellite, fiber, wireless).
- K0111 Knowledge of network tools (e.g., ping, traceroute, nslookup)
- K0113 Knowledge of different types of network communication (e.g., LAN, WAN, MAN, WLAN, WWAN).
- K0136 Knowledge of the capabilities of different electronic communication systems and methods (e.g., e-mail, VOIP, IM, web forums, Direct Video Broadcasts).
- K0138 Knowledge of Wi-Fi.
- K0332 Knowledge of network protocols such as TCP/IP, Dynamic Host Configuration, Domain Name System (DNS), and directory services.
- S0033 Skill in diagnosing connectivity problems.
- S0035 Skill in establishing a routing schema.
- S0041 Skill in installing, configuring, and troubleshooting LAN and WAN components such as routers, hubs, and switches.
- S0162 Skill in applying various subnet techniques (e.g., CIDR)

## Alignment of Learning Outcomes, Assessment and Graduate Attributes

 N/A Level	 Introductory Level	 Intermediate Level	 Graduate Level	 Professional Level	 Advanced Level
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### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
1 - Written Assessment - 20%	•	•			
2 - Written Assessment - 30%			•	•	•
3 - In-class Test(s) - 50%	•	•	•	•	•

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
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					

## Textbooks and Resources

### Textbooks

COIT20261

#### Prescribed

#### Data Comms And Networking With Tcp/Ip Protocol Suite

Edition: 6th edn (2021)

Authors: Forouzan, B

McGraw Hill

New York , NY , USA

ISBN: 9781260597820 print ; 9781264363353 ebook

Binding: Paperback

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

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

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Cisco Packet Tracer
- Wireshark - Network Protocol Analyser

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Hong Shen** Unit Coordinator

[h.shen@cqu.edu.au](mailto:h.shen@cqu.edu.au)

## Schedule

### Week 1 - 08 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Introduction; TCP/IP Protocol Suite; Numbering Systems	Chapter 1 & Appendix B	

### Week 2 - 15 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to the Transport Layer; User Datagram Protocol (UDP)	9	

### Week 3 - 22 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Transmission Control Protocol (TCP)	9	

### Week 4 - 29 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
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Introduction to the Network Layer; IPv4 Addresses Part I 7

#### Week 5 - 05 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
IPv4 Addresses Part II	7	

#### Vacation Week - 12 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
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#### Week 6 - 19 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Delivery and Forwarding of IP Packets; Address Resolution Protocol (ARP)	7	Assessment #1 due on Friday 25 August  <b>WRITTEN ASSESSMENT 1: IP NETWORKING</b> Due: Week 6 Friday (23 Aug 2024) 11:45 pm AEST

#### Week 7 - 26 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Internet Protocol Version 4 (IPv4); Internet Control Message Protocol (ICMP)	7	Assessment #1 return on Friday 1 September

#### Week 8 - 02 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Unicast Routing Protocols (RIP, OSPF, and BGP)	8	

#### Week 9 - 09 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
IPv6 Addressing; IPv6 Protocol; Routing in IPv6; ICMPv6	7	

#### Week 10 - 16 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Routing in Wireless Networks	Chapter 4 discusses basic WiFi Lecture will discuss wireless routing protocols using other sources	Assessment #2 due on Friday 24 September  <b>WRITTEN ASSESSMENT 2: ROUTING AND SWITCHING</b> Due: Week 10 Friday (20 Sept 2024) 11:45 pm AEST

#### Week 11 - 23 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Host Configuration: DHCP; Domain Name System (DNS)	Chapter 10 discusses DNS. Lecture will discuss DHCP using other sources	Assessment #2 return on Friday 29 September

#### Week 12 - 30 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Switching in LANs and WANs; Multi-Protocol Label Switching (MPLS)	Chapter 7 and online sources	Assessment #3 (online test) is held in the Tutorial session.

#### Review/Exam Week - 07 Oct 2024

Module/Topic	Chapter	Events and Submissions/Topic
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#### Exam Week - 14 Oct 2024

Module/Topic	Chapter	Events and Submissions/Topic
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## Assessment Tasks

### 1 WRITTEN ASSESSMENT 1: IP NETWORKING

**Assessment Type**

Written Assessment

**Task Description**

You are required to demonstrate your knowledge of IP networking, including IP addressing and subnetting, by completing a number of exercise questions. There will be multiple questions requiring a mix of numerical and descriptive answers. Exploratory exercises using common networking tools may also be presented. The assessment and further description of the requirements can be found in Moodle. This is an individual assignment, and no group work or group submission applies.

**Assessment Due Date**

Week 6 Friday (23 Aug 2024) 11:45 pm AEST

Your assignment must be submitted in Moodle in the format specified in the assignment. See Moodle unit website for details.

**Return Date to Students**

Week 8 Friday (6 Sept 2024)

We aim to return marks and feedback to you by this date.

**Weighting**

20%

**Assessment Criteria**

Your answers will be marked based on technical correctness, completeness, clarity and relevance. Questions that ask you to show your working or calculations or the steps you took to arrive at your answers, may have marks deducted if such information is not provided. If a question requires you to submit a graphic (e.g. a screenshot or a diagram), the graphic must have sufficient resolution to show all its details clearly and be of a reasonable size for normal reader viewing, with all or any text within the graphic being legible and readable, in order to be marked. If a question asks for an explanation or discussion followed by "(essential)", it means that at least 50% of the allocated mark is for the explanation or discussion, the rest is for the balance of the answer.

**Referencing Style**

- [Harvard \(author-date\)](#)

**Submission**

Online

**Submission Instructions**

The assignment must be submitted online in Moodle.

**Learning Outcomes Assessed**

- Apply your knowledge in Network Routing to solve problems in wired and wireless networks
- Develop IP addressing plans for organisational networks

### 2 WRITTEN ASSESSMENT 2: ROUTING AND SWITCHING

**Assessment Type**

Written Assessment

**Task Description**

You are required to demonstrate your knowledge of routing and switching in networks, by completing a number of exercise questions. There will be multiple questions requiring a mix of numerical and descriptive answers. Questions that ask you to show your working or calculations or the steps you took to arrive at your answers, may have marks deducted if such information is not provided. Some questions may require research of technologies or relevant technology trends not covered in lectures or the textbook. The assessment and detailed description of the requirements can be found in Moodle.



This is an individual, not a group, assignment.

**Assessment Due Date**

Week 10 Friday (20 Sept 2024) 11:45 pm AEST

Your assignment must be submitted in the format specified in the assignment. See Moodle unit website for details.

**Return Date to Students**

Week 12 Friday (4 Oct 2024)

We aim to return marks and feedback to you by this date.

**Weighting**

30%

**Assessment Criteria**

Your answers will be marked based on technical correctness, completeness, clarity, originality and relevance. Proper use of referencing conventions are expected and marks may be deducted for failure to comply. For discussion or research-based questions, if you decide to submit a graphic (e.g. a screenshot or a diagram) in support of your answer, the graphic must be relevant to your discussion, be appropriately referenced, and must have sufficient resolution to show all its details clearly and be of a reasonable size for normal reader viewing, with any text within the graphic being legible and readable. Originality means the work is your own and is expressed in your own words. An answer is unacceptable if it is composed mostly of quoted material from other sources, and may receive no marks as a result.

Questions that ask you to show your working or calculations or the steps you took to arrive at your answers, may have marks deducted if such information is not provided. If a question asks for an explanation or discussion followed by "(essential)", it means that at least 50% of the allocated mark is for the explanation or discussion, the rest is for the balance of the answer.

**Referencing Style**

- [Harvard \(author-date\)](#)

**Submission**

Online

**Submission Instructions**

The assignment must be submitted online in Moodle.

**Learning Outcomes Assessed**

- Analyse the application of wireless network technologies in different scenarios
- Compare and contrast the protocols and standards in routing and switching
- Evaluate the complexities involved in transitioning to new technologies such as IPv6.

## 3 In-class Test

**Assessment Type**

In-class Test(s)

**Task Description**

The final assessment is a supervised in-class test that must be completed in class on campus - student attendance is therefore required. The test consists of 20 questions including a mix of multiple-choice and short answer items drawn from the range of topics studied during the term. The test is time-limited to 2 hours, will be open-book, and will be available during the final tutorial session of the term (Week 12).

The questions may include tests of terms and concepts learned during term, may ask you to solve practical problems relating to routing and switching operations, or could require you to provide an explanation of protocols or functions or networking and routing concepts. The format includes multiple-choice style questions, plus questions requiring you to type in answers in your own words.

Further details will be released in second half of term.

**Assessment Due Date**

Due date is at the conclusion of your scheduled tutorial session during Week 12

**Return Date to Students**

Formal results will become available on Certification Day.

**Weighting**

50%

**Assessment Criteria**

Many answers will be marked automatically by the Quiz. A few are marked by hand.

Answers not marked automatically will be marked based on technical correctness, completeness, clarity, originality and relevance. Originality means the work is your own and is expressed in your own words. An answer is unacceptable if it is composed mostly of quoted material from other sources, and may receive no marks as a result. Use of ChatGPT or any other language-based generative-AI technology is not permitted at any time.

Questions that ask you to show your working or calculations or the steps you took to arrive at your answers, may have marks deducted if such information is not provided. If a question asks for an explanation or discussion followed by "(essential)", it means that at least 50% of the allocated mark is for the explanation or discussion, the rest is for the balance of the answer.

**Referencing Style**

- [Harvard \(author-date\)](#)

**Submission**

Online

**Submission Instructions**

The test will be taken and submitted through Moodle

**Learning Outcomes Assessed**

- Apply your knowledge in Network Routing to solve problems in wired and wireless networks
- Develop IP addressing plans for organisational networks
- Analyse the application of wireless network technologies in different scenarios
- Compare and contrast the protocols and standards in routing and switching
- Evaluate the complexities involved in transitioning to new technologies such as IPv6.

## 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