



COMP8250

Advanced Topics in Computer Networks

Session 1, In person-scheduled-weekday, North Ryde 2025

School of Computing

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General Information

Unit convenor and teaching staff

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By appointment

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Credit points

10

Prerequisites

COMP6250 OR Admission to the GradDipRes or GradCertRes

Corequisites

Co-badged status

COMP7250

Unit description

This unit examines the complex and evolving landscape of computer networks. The unit offers an in-depth understanding of complex networking concepts by exploring pertinent advancements in networking technology especially from a service provider's viewpoint, including aspects like policy-based routing, addressing, advanced switching, and network security. This unit incorporates project management skills to enrich the learning experience and facilitate the practical application of network-related concepts. Complementing the theoretical knowledge, this unit integrates hands-on practical exercises, enabling students to work directly with Cisco networking equipment and cutting-edge simulation tools. These activities bridge the gap between theory and practice, allowing students to apply the knowledge acquired in lectures to real-world scenarios by configuring and troubleshooting network devices.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals ([UNSDGs](#)) Industry, Innovation and Infrastructure

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

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

ULO1: Build, configure, and troubleshoot complex network infrastructures, incorporating advanced routing protocols and security measures to ensure robust and efficient data transmission.

ULO2: Analyse and Design Internet Routing Architectures and high-speed switching technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.

ULO3: Apply project management tools and techniques to plan, execute, and oversee network-related projects, ensuring efficient deployment of network solutions and timely delivery of results.

ULO4: Collaborate and communicate with others in a professional setting in both written and oral form.

ULO5: Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

General Assessment Information

Requirements to Pass this Unit

To pass this unit you must:

- Achieve a total mark equal to or greater than 50%.

There are no hurdles in this unit.

Late Assessment Submission Penalty

From 1 July 2022, Students enrolled in Session based units with written assessments will have the following late penalty applied. Please see <https://students.mq.edu.au/study/assessment-exams/assessments> for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at **11:55 pm**. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance

assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for [Special Consideration](#).

In this unit, late submissions will be accepted as follows:

- Quiz 1: NO, unless Special Consideration is granted
- Quiz 2: NO, unless Special Consideration is granted
- Assignment 1: YES, Standard Late Penalty applies
- Assignment 2: YES, Standard Late Penalty applies

Special Consideration

The [Special Consideration Policy](#) aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable, and significantly disruptive, and which may affect their performance in an Assessment. If you experience circumstances or events that affect your ability to complete the Assessments in this Unit on time, please inform the Convenor and submit a Special Consideration Request through <https://connect.mq.edu.au>.

Release Dates

- Quiz 1: To be released no later than 18th April.
- Quiz 2: To be released no later than 30th May.
- Assignment 1: To be released no later than 5th May.
- Assignment 2: To be released no later than 16th June.

Assessment Tasks

Name	Weighting	Hurdle	Due
Quiz 1	20%	No	In Week 6, during the registered practical class
Quiz 2	20%	No	In Week 10, during the registered practical class
Assignment 1	20%	No	11/04/2025
Assignment 2	30%	No	23/05/2025
Workshop	10%	No	Weekly

Quiz 1

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 15 hours

Due: **In Week 6, during the registered practical class**

Weighting: **20%**

A short (closed book) test that will be based on the previously covered lecture topics.

On successful completion you will be able to:

- Analyse and Design Internet Routing Architectures and high-speed switching technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

Quiz 2

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 15 hours

Due: **In Week 10, during the registered practical class**

Weighting: **20%**

A short (closed book) test that will be based on the previously covered lecture topics.

On successful completion you will be able to:

- Analyse and Design Internet Routing Architectures and high-speed switching technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

Assignment 1

Assessment Type ¹: Problem set

Indicative Time on Task ²: 20 hours

Due: **11/04/2025**

Weighting: **20%**

The problem-solving assignment serves the purpose of familiarizing students with real-world problem situations and issues. It is structured to equip students with the skills needed to analyze specific problems comprehensively and devise optimal solutions. Certain questions within this assignment may necessitate extensive research and critical thinking to arrive at a well-founded

and practical answer.

On successful completion you will be able to:

- Analyse and Design Internet Routing Architectures and high-speed switching technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

Assignment 2

Assessment Type ¹: Project

Indicative Time on Task ²: 40 hours

Due: **23/05/2025**

Weighting: **30%**

In the group-based project, students are tasked with delving into a specific topic, conducting thorough research, performing critical analyses, and presenting well-founded conclusions. Throughout this assignment, students will not only harness their advanced networking knowledge but also apply essential project management principles and tools. This assessment task not only enhances their project management skills but also deepens their understanding of advanced networking practices and their applications in complex, contemporary network environments.

On successful completion you will be able to:

- Analyse and Design Internet Routing Architectures and high-speed switching technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.
- Apply project management tools and techniques to plan, execute, and oversee network-related projects, ensuring efficient deployment of network solutions and timely delivery of results.
- Collaborate and communicate with others in a professional setting in both written and oral form.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

Workshop

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 10 hours

Due: **Weekly**

Weighting: **10%**

A Workshop which consists of lab work and problem solving tasks

On successful completion you will be able to:

- Build, configure, and troubleshoot complex network infrastructures, incorporating advanced routing protocols and security measures to ensure robust and efficient data transmission.
- Collaborate and communicate with others in a professional setting in both written and oral form.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Lectures

A 2 hour Lecture would be delivered each week on campus. Students are highly encouraged to ask questions from the Lecturer(s) in a bid to clarify anything they might not be sure of. Students are also encouraged to engage in active discussion via the General Discussion Forum on iLearn.

Lecture Notes (Slide Decks) would be made available, however, they are not a substitute of the recommended Readings. Please note that Digital Recordings of the Lectures would be available via the Macquarie University's Echo360 Active Learning Platform.

Workshops

The workshops aim to solidify the concepts discussed in the lectures by engaging students in hands-on and problem solving exercises. Students have the opportunity to practice their networking skills under the guidance of a demonstrator. There will be one **2-hour** workshop session each week, starting in week **2** and each workshop exercise is worth **2** marks with an overall weighting of **10%**. These sessions are conducted in a specially-equipped networking laboratory. There is no opportunity to conduct workshops outside of the assigned sessions. Weeks **12** and **13** are catchup weeks and provide an opportunity to do any workshop exercise(s) that were missed over the course of the semester (weeks 2-11). Each week, students receive exercises to work on. Keeping up with these exercises is crucial, as it aids in understanding the unit's content and prepares students for assignments.

Note: Please note that catch-up classes are intended for students who have missed a few labs due to genuine reasons. Special consideration approval is required for students who have missed more than two labs, up to a maximum of four labs. Students who have failed to attend any lab class during the semester are not allowed to use these sessions to make up for missed work.

It's important to note that while workshops are structured in alignment with lecture content, there may not always be direct one-to-one correspondence. This is due to the necessity for workshops allowing students to familiarize themselves with new tools and devices. As a result, there are limitations on available time slots for experimenting with technologies discussed in certain lectures.

Note: Workshops commence in Week 2.

Assignments

Assignments would be made available on iLearn and would be submitted online via Turnitin.

Assignment 1-Problem Solving: The problem-solving assignment serves the purpose of familiarizing students with addressing real-world problems or issues. Its design is intended to guide students in analyzing specific problems and identifying optimal solutions. This assignment aims to enhance the students' ability to apply theoretical knowledge to real-world scenarios. Certain questions may necessitate thorough research, and arriving at an acceptable and reasonable answer will be a step-by-step process.

Assignment 2-Group based Assignment: In this assignment, students are expected to apply their understanding of networking to conduct in-depth research and perform a critical analysis of pertinent literature within this field. They are then required to present their findings and conclusions. Furthermore, this assessment provides a valuable context for students to apply project management principles and tools, ensuring effective coordination, planning, and execution of their group project. This experience offers an opportunity for students to enhance their collaborative skills, professional communication, and the practical application of project management concepts.

Although this assignment is a group effort, it's important to emphasize that individual

accountability remains a crucial aspect. Each team member is responsible for their own contributions and work within the group context.

Quizzes

There are two quizzes scheduled during the semester. Each quiz carries a weightage of 20%. These quizzes, short tests in nature, will draw upon your prior attempts at discussion questions and the content covered in previous lectures. They will be conducted online via iLearn during your workshop session, with the questions provided at the start of the session.

Recommended Text

It should be noted that no single Textbook addresses all Topics of this Unit. Accordingly, a large proportion of the Lecture Notes are drawn from the Research Papers, White Papers, and Standards' Documents. Students are, therefore, encouraged to read the recommended Reading List to gain a solid understanding of the Topics. Nevertheless, some suggested Books include:

[Computer Networks and Internets, Global Edition, Sixth Edition \(Author : Douglas E. Comer\)](#)

[Computer Networking : A Top-Down Approach, Global Edition, Eight Edition \(Authors : James F. Kurose and Keith W. Ross\)](#)

[Internetworking with TCP / IP : Principles, Protocols, and Architecture – Volume 1, Sixth Edition \(Author : Douglas E. Comer\)](#)

Methods of Communication

We will communicate with you via your Macquarie University's Email or through Announcements on iLearn. Queries to Convenor can either be placed on the iLearn Discussion Board or sent to the teaching staff from your University Email Address.

COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie University's website, <https://www.mq.edu.au/about/coronavirus-faqs>. Remember to check this page regularly in case the information and requirements change during the Semester. If there are any changes to this Unit in relation to COVID, these will be communicated via iLearn.

Unit Schedule

Week #	Lecture / Activity	Assessment Task
Week 1	Unit Introduction, IT Project Management	
Week 2	Classless Inter Domain Routing	
Week 3	Internet Routing Architectures	
Week 4	Border Gateway Protocol – Part I	

Week 5	Border Gateway Protocol – Part II	
Week 6	Multiprotocol Label Switching	Quiz 1 – Due
Week 7	Virtual Private Networks	Assignment 1 – Due
Week 8	Network Security – Part I	
Week 9	: Network Security – Part II	
Week 10	Software Defined Networking (SDN)	Quiz 2 – Due
Week 11	The Future of Networking	Assignment 2 – Due
Week 12	Group Presentations	
Week 13	Unit Review	

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies](https://students.mq.edu.au/support/study/policies) (<https://students.mq.edu.au/support/study/policies>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault

- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Unit information based on version 2025.05 of the [Handbook](#)