



COMP2250

Data Communications

Session 1, In person-scheduled-weekday, North Ryde 2023

School of Computing

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General Information

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Credit points

10

Prerequisites

(COMP1000 or COMP115) or (COMP1350 or ISYS114)

Corequisites

Co-badged status

Unit description

This unit introduces basic data communication concepts, theory and practice within the context of the use of communication networks in organisations.

Topics include:

- protocols and standards, including the OSI model
- network switching and routing
- LAN and WAN topologies
- wireless networking
- network hardware, such as routers, modems, repeaters, switches and hubs
- public telecommunication-based data services
- the effect of telecommunications on society
- the role of telecommunications within organisations
- introduction to security and network management
- organisational management of telecommunications
- introduction to network design
- regulatory frameworks

Practical work includes basic network hardware set up and protocol performance in a specialised laboratory using dedicated switching and routing equipment.

This unit does not presume any knowledge of programming nor is there any programming work in the unit.

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: Explain the importance and the role of network protocols including why they are organised into protocol stacks and how protocol stacks function.

ULO2: Demonstrate an understanding of IP addressing, routing and subnetting by for example computing routing outcomes and determining effective and actual IP addresses.

ULO3: Differentiate among LAN components, and describe and, in particular instances calculate, how MAC addresses, address resolution and the ethernet protocol interact.

ULO4: Evaluate different network designs based on an awareness of different major network technologies including wireless, backbone, wide area networks, and the Internet

ULO5: Demonstrate technical networking proficiency including ability to configure, construct, and document, and in simple cases, design networks, as well as the ability to perform traffic analysis on local area networks.

ULO6: Develop plans for dealing with network security and management.

General Assessment Information

The goals of the assessment items in this unit is for students to demonstrate an understanding how data can travel between locations, describe the functions and limitations of each layer in the OSI model, and to link various security / ethical / governance decisions that can be made around network designs and functions. There are two individual assignments that cover different layers of the OSI model and some decisions around network configuration and ethics / security questions. There are also module exams which are done as iLearn quizzes. These quizzes are intended to test student knowledge about what decisions and operations occur in each OSI layer and what architectural decisions can be made about network configurations in local networks, backbone networks, and wide area networks.

Assignments

Assignment work must be written clearly, with good grammar, correct word usage, correct punctuation, and lack of spelling errors. Poor or bad expression will be penalized. Wherever required, all written work must be properly referenced and conform to standard stylistic conventions and citation methods outlined in the assignment specifications.

Late Submission of Assignments 1 and 2: 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 Assignment 1 and 2 are set at 11:55 pm of the end of the week (Sunday) specified. A 1-hour grace period is provided to students who experience a technical concern. No special consideration is required for the grace period.

Practicals

Practical classes start in week 2, however, there is a quiz / activity that students must do in week 1 in place of the practical class. The week 1 activity can be done at home and only requires access to iLearn to attempt / complete the activity and quiz questions (as part of an induction).

Note that while the practical material is structured to follow the lecture material, students need to keep in mind that there will not always be a one to one mapping between the practical exercises and the lecture topics. This is because of a need for some practical sessions to introduce new tools and devices before following up with the related concepts.

HURDLE REQUIREMENT for the practical classes: there are in-class practical activities and associated submissions / answers required for each practical class - a total of 12 practical submissions. 6 practicals activity submissions in the first half of the semester, and 6 practical activity submissions in the second half of the semester. The hurdle requirement to be eligible to

pass the unit is to have a reasonable attempt at a minimum of 4 out of the 6 submissions for the first half AND a minimum of 4 out the 6 submissions for the second half. It is strongly recommended that students engage in all of the practical activities and submissions as they will assist in the study (and feedback) preparations for the module exams. The practical tasks are a very important component of the unit - especially for unit learning outcome 5.

If you miss a practical class or submission due to illness / misadventure, there are catchup practicals scheduled for the second week of the mid semester break and the first week of the final exam period. Details about days / times and how to self-enrol in these catchup classes will be provided in the unit iLearn page.

Module Exams

The module exams are iLearn-based quizzes that assess concepts covered in lectures (and associated practical class exercises). **There is only 1 attempt at each module exam.** Details of the 'fit to sit' model for exams can be found [here](#).

If you miss a module exam due to illness / misadventure, then a supplementary exam will only be arranged upon an approved special consideration application through the university ask.mq.edu.au site. Otherwise, a mark of 0 will be applied for that module exam. For details of the module exam schedule, see the unit schedule section of the unit guide, but also check the COMP2250 unit information section in iLearn for updates and scope of examination.

Requirements to pass this unit

In order to pass the unit, you must achieve a final grade of 50 out of 100 or above and have cleared the hurdle requirement for the unit as detailed above. Each assessment contributes to a certain percentage of the final grade. These weightings are listed in the assessment tasks table in this unit guide.

Assessment Tasks

| Name | Weighting | Hurdle | Due |
|-------------------------------------|-----------|--------|---|
| Practical Workshops | 20% | Yes | Weekly |
| Assignment 1 | 20% | No | End of first week of mid-session teaching break |
| Assignment 2 | 20% | No | End of week 12 |
| Module Exams | 40% | No | Multiple |

Practical Workshops

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 0 hours

Due: **Weekly**

Weighting: **20%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

Development of knowledge and skills requires continual practice. Each week, you must complete the practice-based tasks within class and present appropriate documentation, as outlined in the questions.

On successful completion you will be able to:

- Explain the importance and the role of network protocols including why they are organised into protocol stacks and how protocol stacks function.
- Demonstrate an understanding of IP addressing, routing and subnetting by for example computing routing outcomes and determining effective and actual IP addresses.
- Differentiate among LAN components, and describe and, in particular instances calculate, how MAC addresses, address resolution and the ethernet protocol interact.
- Demonstrate technical networking proficiency including ability to configure, construct, and document, and in simple cases, design networks, as well as the ability to perform traffic analysis on local area networks.

Assignment 1

Assessment Type ¹: Report

Indicative Time on Task ²: 30 hours

Due: **End of first week of mid-session teaching break**

Weighting: **20%**

The first assignment tests students understanding of network stacks, layering, and addressing techniques.

On successful completion you will be able to:

- Explain the importance and the role of network protocols including why they are organised into protocol stacks and how protocol stacks function.
- Demonstrate an understanding of IP addressing, routing and subnetting by for example computing routing outcomes and determining effective and actual IP addresses.
- Differentiate among LAN components, and describe and, in particular instances calculate, how MAC addresses, address resolution and the ethernet protocol interact.

Assignment 2

Assessment Type ¹: Report

Indicative Time on Task ²: 30 hours

Due: **End of week 12**

Weighting: **20%**

The second assignment tests your understanding of selected networking technologies.

On successful completion you will be able to:

- Demonstrate an understanding of IP addressing, routing and subnetting by for example computing routing outcomes and determining effective and actual IP addresses.
- Differentiate among LAN components, and describe and, in particular instances calculate, how MAC addresses, address resolution and the ethernet protocol interact.
- Evaluate different network designs based on an awareness of different major network technologies including wireless, backbone, wide area networks, and the Internet
- Develop plans for dealing with network security and management.

Module Exams

Assessment Type ¹: Examination

Indicative Time on Task ²: 20 hours

Due: **Multiple**

Weighting: **40%**

The module examinations ask students to answer conceptual questions about the course material as well as solve simple networking problems.

On successful completion you will be able to:

- Explain the importance and the role of network protocols including why they are organised into protocol stacks and how protocol stacks function.
- Demonstrate an understanding of IP addressing, routing and subnetting by for example computing routing outcomes and determining effective and actual IP addresses.
- Differentiate among LAN components, and describe and, in particular instances calculate, how MAC addresses, address resolution and the ethernet protocol interact.
- Evaluate different network designs based on an awareness of different major network

technologies including wireless, backbone, wide area networks, and the Internet

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

Lectures are the primary introduction for content along with the prescribed readings (see below for details). The lecture is 2 hours each week. Students enrolled in the online version of the unit are welcome to attend the lecture on campus. The lectures are recorded using the ECHO360 platform and recordings (assuming no technical difficulties occur) are made available through the unit iLearn page.

Practical Classes

There is a take-home practical activity for week 1 that students need to complete, however, scheduled practical classes for COMP2250 start in week 2. There is another take-home practical activity in week 8 due to the Tuesday public holiday. So, no scheduled practical classes will run in week 1 nor in week 8.

Each week, students should attend two hours of lectures, and a two hour practical workshop (except in week 1, and week 8 - which are take-home tasks). For details of days, times and rooms consult eStudent.

Face to face classes have a requirement of enclosed shoes for OH&S reasons. Further communication and details are provided in iLearn.

Students must attend the practicals that they are enrolled in.

Text Books and Digital Resources (Leganto)

The textbook for this semester is:

Fitzgerald, J. & Dennis, A, Business Data Communications and Networking, Fourteenth Edition, Wiley, 2021

Additional reading that students may find useful for this unit:

Kurose, J. & Ross, K. Computer Networking: A Top-Down Approach 7th edn, Pearson, 2016

The university does have a limited number of 'seats' available for online access to the text book (using your OneID to log in) through the Leganto block on iLearn.

Technologies Used and Required

This unit will be using networking lab equipment and lab computers for the practicals. The lab computers have Wireshark and other software installed. Online students will be required to install Wireshark and Cisco Packet Tracer on their own device. Details are provided in iLearn for versions, activities, and installation methods.

Communication Methods in COMP2250

All announcements about unit-related matters will be communicated through iLearn. It is the student's responsibility to ensure they check iLearn announcements, forums, and FAQ sections regularly.

Students are encouraged to use the iLearn forums for asking questions about unit content and concepts. Where questions are about specific details in an assessment submission, this may need to be sent via a private forum post in the first instance (details are provided in iLearn about how this is set up) so as not to be at risk of breaching the university academic integrity policy.

Any one-on-one communication with unit staff that is via email must be done through the student's official university email account (the one ending with '@students.mq.edu.au'). There may be occasions where unit staff will email a student directly to their @students.mq.edu.au email address. It is the student's responsibility to ensure they check their official university email regularly for communications from the university staff. While a best effort is made for fast responses, please do be mindful that some units have in excess of 500 to 1000 students. So, read the unit iLearn communications section carefully about where to best direct your query depending on the nature of the query.

Unit Schedule

Tentative Schedule (subject to change)

| Week | Lecture Topic | Textbook Chapter Related To Lecture Topic | Practical Activity / Submission | Assessment Information | Other Notes |
|------|-----------------------|---|-------------------------------------|------------------------|--|
| | Introduction and LANs | Ch 7 (7.1 to 7.3) | At-home submission / induction quiz | | No scheduled prac classes in week 1, however there is a take-home activity that students need to complete which counts toward the practical hurdle submission count. |
| | OSI Layer 3 | Ch 5 | In-class activities + submissions | | |

| Week | Lecture Topic | Textbook Chapter Related To Lecture Topic | Practical Activity / Submission | Assessment Information | Other Notes |
|------|--|---|-----------------------------------|--|---|
| | Subnetting and OSI Layers 5, 6, and 7 | Ch 2 + Ch 5 | In-class activities + submissions | | |
| | OSI Layer 4 | Ch 5 | In-class activities + submissions | | |
| | OSI Layer 1 | Ch 3 | In-class activities + submissions | | |
| | OSI Layer 2 | Ch 4 | In-class activities + submissions | | |
| | Wireless | Ch 7 (7.4 to 7.7) | In-class module exams | In-class module exams | Note: Due to the module exam running this week during the practical classes, there will not be a practical activity nor an associated submission this week. |
| | | | | Assignment 1 due at the end of this week | |
| | | | | | |
| | Security, Ethics, Privacy, and other issues. | Ch 11 + Ch 5.7 | At-home activity + submissions | | Note: Due to the Tuesday public holiday, no scheduled COMP2250 pracs will run in week 8 |
| | Security Controls | Ch 11 | In-class activities + submissions | | |
| | Backbone Networks | Ch 8 | In-class activities + submissions | | |
| | Wide Area Networks | Ch9 | In-class activities + submissions | | |

| Week | Lecture Topic | Textbook Chapter Related To Lecture Topic | Practical Activity / Submission | Assessment Information | Other Notes |
|------|---------------|---|-----------------------------------|---|-------------|
| | The Internet | Ch 10 | In-class activities + submissions | Assignment 2 due at the end of this week | |
| | Revision | | In-class activities + submissions | | |
| | | | | Module exams held during the examination period (scheduled by the central exams team) | |

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 <ask.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 [AskMQ](#), 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.

Changes from Previous Offering

In previous years, the module exams were scheduled throughout the semester which generated a high number of special considerations due to illness / COVID-related isolation rules, but also ate into a significant portion of time students had with the lab equipment and other associated activities. The number of module exam sessions has been reduced to allow more time for students to work with the lab equipment and practice more concepts in the labs. There is only one attempt at each module exam.

Changes to lecture content have been made to include Ethics and Governance aspects of network design based on feedback from the external re-accreditation processes with the Australian Computer Society (ACS). Assignment 2 has been updated to assess aspects of these changes based on the ACS feedback as well.

We are also trialing a "self-enrolment" catchup class process for students who miss practicals and are at risk of failing the hurdle. Details are provided in the iLearn page for COMP2250.