COMP2250

Data Communications

Session 3, Fully online/virtual 2021

School of Computing

Contents

General Information 2

Learning Outcomes 3

General Assessment Information 3

Assessment Tasks 5

Delivery and Resources 7

Unit Schedule 9

Policies and Procedures 10

Changes from Previous Offering 12

Disclaimer

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Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of units with mandatory on-campus classes/teaching activities.

Visit the MQ COVID-19 information page for more detail.

General Information

Unit convenor and teaching staff
Damian Jurd
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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

Submission of assessable work

For all your assignments, and for your professional life in the future, you are encouraged to

- set your personal deadline earlier than the official deadline
- keep backups of all your important files
- make sure that no-one else has access to your files or documents

Late work will not be accepted. Develop good working habits and manage your time well. If your contributions are seriously affected by illness or misadventure you do your utmost to submit a request for special consideration **before** the due date, do not email the unit convenor directly.

Practical Workshops

Due: **Weekly (starting week 1)** Weighting: **20%**

The practical work in this unit makes up 20% of your mark. The practical work is divided up into twelve practical classes.

To receive your marks you must attend the practical section and demonstrate your completion of the practical exercises to your practical supervisor. Earning the marks will require not only successful completion of the exercises, but submission of appropriate documentation, as

outlined in the question sheets. You must complete the practical session in the week it is allocated.

We will take the best ten out of your twelve submissions to calculate your final mark for this section.

Practical classess will commence during week 1 of the semester. Students must attend their enrolled practical session.

Note that while the practical material is structured against the lecture material, you 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 you need some practical sessions to get acquainted to new tools and devices thereby limiting the number of practical time slots available to experiment with technologies discussed in some lectures.

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 penalised, Wherever required, all written work must be properly referenced and conform to standard stylistic conventions.

Assignment 1

Due: **Mid-semester break** Weighting: **20%**

The first assignment tests your understanding of network protocols, protocol stacks and layers, local area networks, and IP addressing.

Assignment 2

Due: **Week 5 (last week of classes)** Weighting: **20%**

The second assignment tests your understanding of selected networking technologies.

Final Exams

Due: **Final exam period (week 7)** Weighting: **40%**

The final examination ask students to apply what they have learned during the semester to a provided scenario, which may involve the analysis, design, and troubleshooting of a network. In the case a student cannot attend the final exam, a request for special consideration must be made.

If you receive special consideration for the final exam, a supplementary exam will be scheduled for a time in February 2022. By making a special consideration application for the final exam you are declaring yourself available to sit during the supplementary examination period and you will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification approximately one week prior to the exam with the exact date and time of the supplementary examination.

Assessment Tasks

Name	Weighting	Hurdle	Due
Practical Workshops	20%	No	Weekly
Assignment 1	20%	No	Mid-semester break
Assignment 2	20%	No	Week 5 (last week of classes)
Final Exam	40%	No	Final Exam Period (week 7)

Practical Workshops

Assessment Type [1]: Demonstration
Indicative Time on Task [2]: 0 hours
Due: **Weekly**
Weighting: **20%**

To receive marks students must attend the practical session and demonstrate completion of the exercises to their practical supervisor.

Earning the marks will require not only successful completion of the exercises, but presentation of appropriate documentation, as outlined in the questions.

You must complete the practical session in the week it is allocated.

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: **Mid-semester 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: **Week 5 (last week of classes)**
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.

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 15 hours
Due: **Final Exam Period (week 7)**

Weighting: **40%**

The final exam asks students to apply the knowledge they have gained through the semester to one or more given network scenarios. Tasks to be completed may include elements of network design, troubleshooting, and the appropriate application of security controls.

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
- Develop plans for dealing with network security and management.

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[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

Classes

As the summer session is only five weeks in length the unit content is covered more rapidly than would be the case for a session 1 or session 2 offering. This means that each week you should attend three two hour lectures, and three two hour practical workshops. For details of scheduled classes consult the timetables webpage.

Note that practicals workshops (lab sessions) commence in **week 1**. The week-by-week details of the practical (lab) classes will be available from iLearn.

You must attend the practical that you are enrolled in.

Textbook and Reading Materials

The textbooks for this semester are:

- Fitzgerald, J. & Dennis, A, Business Data Communications and Networking, Thirteenth Edition, Wiley, 2017
    - Print: ISBN 978-1-119-57166-7
    - E-Text: ISBN 978-1-119-59525-0
- Comer, D. Computer Networks And Internets Sixth Edition, 2015. ISBN 978-0-133-58793-7.

Additional reading that you may find useful for this unit:

- Kurose, J. & Ross, K. Computer Networking: A Top-Down Approach 7th edn, Pearson, 2016
    - Print: ISBN 978-1-292-15359-9
    - E-Text: ISBN 978-1-292-15360-5
- Comer, D. Internetworking With TCP/IP Volume 1: Principles Protocols, and Architecture, 6th edition, 2014. ISBN 978-0-136-08530-0.

  BE CAREFUL to buy correct Comer book!
- Tanenbaum, A. & Wetherall, D. Computer Networks, 5th Edition, Pearson, ISBN 978-0-133-07262-4

Web Resources

Unit Websites

Comp2250 is administered via iLearn (http://ilearn.mq.edu.au/).

This unit outline can be found in the university's unit guides

Live Streaming

Digital recordings of lectures may be available. They will be linked from iLearn.

Technologies Used and Required

In this unit you will will be exposed to the following technology and tools:

- Cisco Packet Tracer software.
- Wireshark Packet Analyzer software.

General Notes

In this unit, you should do the following:

- Attend lectures, take notes, ask questions.
- Attend your weekly Practical session.
- Ensure that you attend moule exams during the first hour of your practical session.
- Read appropriate sections of the text, add to your notes and prepare questions for your lecturer/tutor.
- Work on any assignments that have been released.

Lecture notes will be made available each week but these notes are intended as an outline of the lecture only and are not a substitute for your own notes or the recommended reading list.

Unit Schedule

Tentative teaching schedule, subject to change:

Week	Date	Class	Topic	Reading
1	29/11/2021	Lecture_1	Introduction / LANs	Ch 1 & Ch 7
		Lecture_2	Network Layer	Ch 5
		Lecture_3	Network Layer	Ch 5
	30/11/2021	Practical_1	Wireshark	
	01/12/2021	Practical_2	IP Headers	
	02/12/2021	Practical_3	Subnetting	
2	06/12/2022	Lecture_1	Data-link Layer	Ch 4
		Lecture_2	Application Layer, Transport Layer - UDP	Ch 2 & Ch 5
		Lecture_3	Transport Layer - TCP	Ch 5
	07/12/2021	Practical_1	Packet Tracer	
	08/12/2021	Practical_2	Switches, MAC, and ARP	
	09/12/2021	Practical_3	TCP and FTP	
3	13/12/2022	Lecture_1	Physical Layer	Ch 3
		Lecture_2	Security	Ch 11
		Lecture_3	Security	Ch 11

	14/12/2021	Practical_1	DNS	
	15/12/2021	Practical_2	TBD	
	16/12/2021	Practical_3	NAT	
Mid-Semster Break	20/12/2021	Census Date		
	30/12/2021		Assignment 1	
4	03/01/2022	Lecture_1	Wireless Networks	Ch 8
		Lecture_2	Backbone Networks	Ch 7
		Lecture_3	MANs and WANs	Ch 9
	04/01/2022	Practical_1	WiFi	
	05/01/2022	Practical_2	Single-switch VLANs	
	06/01/2022	Practical_3	Multi-switch VLANs	
5	10/01/2022	Lecture_1	The Internet	Ch 10
		Lecture_2	TBD	
		Lecture_3	Review	
	11/01/2022	Practical_1	Static routing	
	12/01/2022	Practical_2	Dynamic routing - RIP	
	13/01/2022	Practical_3	TBD	
	14/01/2022		Assignment 2	
7	24/01/2022		Final Exam (exact date TBD)	

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (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
- Grade Appeal Policy
- Complaint Management 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). 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) 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

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- 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

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

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

The unit has been reconfigured for 100% online delivery.