COMP6250

Data Communications

Session 1, Online-scheduled-weekday 2022

School of Computing

Contents

General Information

Unit convenor and teaching staff
Unit Convenor
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Credit points
10

Prerequisites

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
- in-depth understanding of key protocols of the TCP/IP protocol suite
- network switching and routing, including both intra-domain and inter-domain routing protocols
- 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 configuration and protocol performance using specialised software.

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 network addressing, routing of traffic between networks and the mechanisms that allow applications to co-exist and interact.

ULO3: Differentiate among LAN components, describe addressing schemes at various layers and how they interact, techniques to resolve them, and in particular instances

calculate addresses.

ULO4: Critically reflect on different major network technologies including wireless, backbone, wide area networks, and the Internet and, being aware of their properties, be able to evaluate different network designs.

ULO5: Demonstrate technical networking proficiency including demonstrated 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: Demonstrate an understanding of, and have an ability to develop plans for dealing with, issues regarding 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 submissions will not be accepted without an approved Special Consideration request. Assessments submitted after the due date will receive a mark of **zero**. 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 via https://ask.mq.edu.au/, **do not email** the unit convenor directly.

Assessment Tasks

Name	Weighting	Hurdle	Due
Final Exam	40%	No	Week 14/15
Practical Workshops	20%	No	Week 2 onwards
Assignment 1	20%	No	Mid-semester break
Assignment 2	20%	No	Week 12

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 10 hours
Due: **Week 14/15**
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 network addressing, routing of traffic between networks and the mechanisms that allow applications to co-exist and interact.
- Differentiate among LAN components, describe addressing schemes at various layers and how they interact, techniques to resolve them, and in particular instances calculate addresses.
- Critically reflect on different major network technologies including wireless, backbone, wide area networks, and the Internet and, being aware of their properties, be able to evaluate different network designs.
- Demonstrate technical networking proficiency including demonstrated 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.
- Demonstrate an understanding of, and have an ability to develop plans for dealing with, issues regarding network security and management.

Practical Workshops

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

To receive marks students must attend the practical section and demonstrate completion of the section 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 network addressing, routing of traffic between networks and the mechanisms that allow applications to co-exist and interact.
- Differentiate among LAN components, describe addressing schemes at various layers and how they interact, techniques to resolve them, and in particular instances calculate addresses.
- Demonstrate technical networking proficiency including demonstrated 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]: 20 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 network addressing, routing of traffic between networks and the mechanisms that allow applications to co-exist and interact.
- Differentiate among LAN components, describe addressing schemes at various layers and how they interact, techniques to resolve them, and in particular instances calculate addresses.

Assignment 2

Assessment Type [1]: Report
Indicative Time on Task [2]: 20 hours
Due: **Week 12**
Weighting: **20%**

The second assignment tests students understanding of selected networking technologies.

On successful completion you will be able to:

- Demonstrate an understanding of network addressing, routing of traffic between networks and the mechanisms that allow applications to co-exist and interact.
- Differentiate among LAN components, describe addressing schemes at various layers and how they interact, techniques to resolve them, and in particular instances calculate addresses.
- Critically reflect on different major network technologies including wireless, backbone, wide area networks, and the Internet and, being aware of their properties, be able to evaluate different network designs.
- Demonstrate an understanding of, and have an ability to develop plans for dealing with, issues regarding 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

Each week you should attend two hours of lectures, and a two hour practical workshop. For details of scheduled classes consult the timetables webpage.

Note that practicals workshops (lab sessions) commence in **week 2**. 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

Comp6250 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:				**Assessment Due**		**Workshop**
Week	**Module**	**Lecture**	**Reading**	**Assessment**	**Weight**	**Practical**
1	Networking Fundamentals (NF)	Introduction	Ch 1			Week 1 No Labs
2		LANs	Ch 7			Wireshark
3	Layers and Stacks (LS)	Network Layer	Ch 5			IP Headers
4		Data-Link Layer	Ch 4			Subnetting
5		Transport Layer - TCP	Ch's 5 & 2			TCP and FTP
6		Application Layer, Transport Layer - UDP	Ch 5			DNS
Mid-Semster Break		Break week 1		Assignment 1	20%	
		Break week 2				
7		Physical Layer	Ch 3			PacketTracer
8	Network Security (NS)	Network Security I	Ch 11			TBD
9		Network Security II	Ch 11			NAT
10	Internetworking and Network Architecture (IA)	IP Routing	Tannenbaum Ch's 18 & 22			Dynamic Routing - RIP
11		Backbone Networks	Ch 8			TBD
12		MAN and WAN	Ch 9	Assignment 2	20%	VLANs
13		Wireless Networks	Ch 7			WiFi
14	Formal Exam Period	Exams week 1		Final Exam	40%	

15		Exams week 2				
16		Exams week 3				

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
- 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). 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

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 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

The unit has been reconfigured for 100% online delivery.