TELE3350

Communications Networks

Session 2, In person-scheduled-weekday, North Ryde 2023

School of Engineering

Contents

General Information

Unit convenor and teaching staff
Convenor
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In class or via email appointment

Credit points
10

Prerequisites
130cp or (COMP2250 or COMP247) or Admission to MEngNetTeleEng or MEngElecEng

Corequisites

Co-badged status

Unit description
This unit develops core knowledge and understanding in telecommunications engineering examining the technology, concepts and general principles used in modern data communication networks. The focus is on layers 1 and 2 of the OSI reference model spanning local-area, wide-area, metropolitan and access networks and includes Ethernet, wireless networks, optical networks, time-division multiplexing networks and cellular networks. The unit examines these technologies from a number of different perspectives including physical-layer communications, medium access control (MAC), link-layer, network structure, devices, modelling, performance analysis and quality of service. A practical component gives students skills in using and configuring network equipment and modelling and analysis tools.

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: Critique and compare, using acquired knowledge, different communication technologies and networks.

ULO2: Evaluate the advantages and performance of a range of networking technologies.

ULO3: Demonstrate knowledge of a range of modelling techniques, including mathematical modelling and simulation modelling, including appropriate simulation tools, to design and analyse communication technologies and networks.
ULO4: Design, build and operate networks using switches and routers.
ULO5: Apply a systems perspective in the analysis of networks and communications systems.
ULO6: Effectively collaborate in small groups while solving networking problems.

General Assessment Information

Grading and passing requirement for unit

In order to pass this unit a student must obtain a mark of 50 or more for the unit (i.e. obtain a passing grade P/ CR/ D/ HD).

If you receive special consideration for the final exam, a supplementary exam will be scheduled by the faculty during a supplementary exam period, typically about 3 to 4 weeks after the normal exam period. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and 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 one week prior to the exam with the exact date and time of their supplementary examination.

Late Assessment Submission

Late assessments are not accepted in this unit unless a Special Consideration has been submitted and approved. This is because worked solutions will be posted a short time after the assessment deadline for efficent and timely feedback to be given to students who have submitted on time. It is not possible to have late submissions from students who will have already seen the worked solutions.

Assessment Tasks

Name	Weighting	Hurdle	Due
Examination	60%	No	Exam Period
Assignment 1	5%	No	End of Week 5
Assignment 2	5%	No	End of Week 7
Assignment 3	5%	No	End of Week 9
Assignment 4	5%	No	End of Week 12
Practicals	20%	No	Weekly

Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 27 hours
Due: **Exam Period**
Weighting: **60%**

Examination

On successful completion you will be able to:

- Critique and compare, using acquired knowledge, different communication technologies and networks.
- Evaluate the advantages and performance of a range of networking technologies.
- Demonstrate knowledge of a range of modelling techniques, including mathematical modelling and simulation modelling, including appropriate simulation tools, to design and analyse communication technologies and networks.
- Apply a systems perspective in the analysis of networks and communications systems.

Assignment 1

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 5 hours
Due: **End of Week 5**
Weighting: **5%**

Assignment on the topic of Ethernet

On successful completion you will be able to:

- Critique and compare, using acquired knowledge, different communication technologies and networks.
- Evaluate the advantages and performance of a range of networking technologies.

Assignment 2

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 5 hours
Due: **End of Week 7**
Weighting: **5%**

Assignment on the topic of Queuing

On successful completion you will be able to:

- Critique and compare, using acquired knowledge, different communication technologies and networks.
- Evaluate the advantages and performance of a range of networking technologies.
- Demonstrate knowledge of a range of modelling techniques, including mathematical modelling and simulation modelling, including appropriate simulation tools, to design and analyse communication technologies and networks.

Assignment 3

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 5 hours
Due: **End of Week 9**
Weighting: **5%**

Assignment on the topic of Frame Relay and Optical Networks

On successful completion you will be able to:

- Critique and compare, using acquired knowledge, different communication technologies and networks.
- Evaluate the advantages and performance of a range of networking technologies.
- Apply a systems perspective in the analysis of networks and communications systems.

Assignment 4

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 5 hours
Due: **End of Week 12**
Weighting: **5%**

Assignment on the topic of modulation, WiFi, and Cellular

On successful completion you will be able to:

- Critique and compare, using acquired knowledge, different communication technologies and networks.
- Evaluate the advantages and performance of a range of networking technologies.
- Apply a systems perspective in the analysis of networks and communications systems.

Practicals

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 25 hours
Due: **Weekly**
Weighting: **20%**

Weekly Practical Sessions

On successful completion you will be able to:

- Design, build and operate networks using switches and routers.
- Apply a systems perspective in the analysis of networks and communications systems.
- Effectively collaborate in small groups while solving networking problems.

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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

The unit will be delivered via lectures, and practical sessions.

Practical sessions

There will be weekly laboratory sessions, starting in Week 2.

Technology used

Library and internet search engines, word processing and presentation software, switches and routers, Matlab software.

Laboratory Safety

No student will be permitted to enter the laboratory without proper footwear. THONGS OR

SANDALS ARE NOT ACCEPTABLE. NO FOOD OR DRINK may be taken into the laboratory.

Suggested reference text book:

Computer Networking James F Kurose & Keith W Ross, 6th Edn, 2012.

Other reference book(s)

Communication Networks A Concise Introduction, by J. Walrand and S. Parekh, Morgan & Claypool Publishers, 2010.

Networking, Second edition, J. S. Beasley, Pearson, 2009.

Data Communications and Networking, 4th Edition by B. A. Forouzan, McGraw-Hill, 2007.

Data and Computer Communications, 9th ed W. Stallings, Pearson, 2012

Lecture and laboratory notes

Lecture notes, laboratory notes, assignments and resources are provided online through iLearn.

Unit Schedule

Refer to iLearn for a full description of unit schedule

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 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

No changes since 2022

Engineers Australia Competency Mapping

		Stage 1 Competencies	ULO1	ULO2	ULO3	ULO4	ULO5	ULO6
Type	ID	Description	Critique and compare, using acquired knowledge, different communication technologies and networks.	Evaluate the advantages and performance of a range of networking technologies.	Demonstrate knowledge of a range of modelling techniques, including mathematical modelling and simulation modelling, including appropriate simulation tools, to design and analyse communication technologies and networks.	Design, build and operate networks using switches and routers.	Apply a systems perspective in the analysis of networks and communications systems.	Effectively collaborate in small groups while solving networking problems.
KNOWLEDGE AND SKILL BASE	1.1	Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.			25%			

KNOWLEDGE AND SKILL BASE	1.2	Conceptual understanding of the mathematics, numerical analysis, statistics, and Electronic and information sciences which underpin the engineering discipline.			25%			
KNOWLEDGE AND SKILL BASE	1.3	In-depth understanding of specialist bodies of knowledge within the engineering discipline	50%	50%			25%	
KNOWLEDGE AND SKILL BASE	1.4	Discernment of knowledge development and research directions within the engineering discipline.						
KNOWLEDGE AND SKILL BASE	1.5	Knowledge of engineering design practice and contextual factors impacting the engineering discipline.				20%		
KNOWLEDGE AND SKILL BASE	1.6	Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.				20%		
ENGINEERING APPLICATION ABILITY	2.1	Application of established engineering methods to complex engineering problem solving.		50%	25%		25%	

ENGINEERING APPLICATION ABILITY	2.2	Fluent application of engineering techniques, tools and resources.			25%	20%	50%	
ENGINEERING APPLICATION ABILITY	2.3	Application of systematic engineering synthesis and design processes	50%			20%		
ENGINEERING APPLICATION ABILITY	2.4	Application of systematic approaches to the conduct and management of engineering projects.				20%		
PROFESSIONAL AND PERSONAL ATTRIBUTES	3.1	Ethical conduct and professional accountability.						25%
PROFESSIONAL AND PERSONAL ATTRIBUTES	3.2	Effective oral and written communication in professional and lay domains.						25%
PROFESSIONAL AND PERSONAL ATTRIBUTES	3.3	Creative, innovative and pro-active demeanour.						
PROFESSIONAL AND PERSONAL ATTRIBUTES	3.4	Professional use and management of information.						
PROFESSIONAL AND PERSONAL ATTRIBUTES	3.5	Orderly management of self, and professional conduct.						
PROFESSIONAL AND PERSONAL ATTRIBUTES	3.6	Effective team membership and team leadership						50%

Changes since First Published

Date	Description
25/09/2023	Remove "tutorial"