



ELEC881

Telecommunications Performance Management

S1 Day 2019

School of Engineering

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General Information

Unit convenor and teaching staff

Unit Convenor - Lecturer

Hazer Inaltekin

hazer.inaltekin@mq.edu.au

44 WTR, Room No 133 (1st Floor)

Wednesday, 11am-12pm

Credit points

4

Prerequisites

Admission to MEng

Corequisites

Co-badged status

Unit description

This unit will develop the knowledge of the modern and future Networks performance management and optimization analysis skills and gives an understanding of Key Performance Indicators Analysis of modern Communication Networks multi-layer multi-technology networks, QoS (Voice and Data all IP, E2E everywhere, any time) , Networks Accessibility, Retain ability, Mobility, Throughput, Integrity, O&M, Load balancing , Web Engineering Analysis.

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:

- Demonstrated ability to work with the specialised Matlab toolboxes such as Simulink, LTE toolbox and 5G toolbox to characterise telecommunications system performance.
- Demonstrated understanding of block-based modelling of telecommunications systems.
- Demonstrated understanding of key performance indicators of modern telecommunications systems such as delay, outage, bit error rates and capacity.
- Demonstrated understanding of main building blocks of modern telecommunications systems such as source/channel coding, modulation/demodulation and multiple access,

and their roles in aggregate telecommunications performance.

Demonstrated understanding of main telecommunications resources such as frequency, power and space, and fundamental tradeoffs among them.

Demonstrated ability in the following areas of professional engineering practice: Ability to work in teams, analytical thinking, self-motivation and self-learning.

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).

Late submissions of project reports are not accepted. Extenuating circumstances will be considered upon lodgment of an application for special consideration. For further details about grading, please refer below in the policies and procedures section.

Final Examination:

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.

Hurdle Requirements:

- The hurdle test is a hurdle requirement. A grade of 60% or more in this test is a condition of passing this unit.
- The final examination is a hurdle requirement. A grade of 40% or more in the final examination is a condition of passing this unit. If you are given a second opportunity to sit the final examination as a result of failing to meet the minimum mark required, you will be offered that chance during the supplementary examination period and will be notified of the exact day and time after the publication of final results for the unit. The second attempt at a hurdle assessment is graded as pass fail. The maximum grade for a second attempt is the hurdle threshold grade.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Weekly Projects</u>	30%	No	Weekly
<u>Hurdle Test</u>	5%	Yes	Week 3
<u>Mid-Semester Test</u>	25%	No	Week 7
<u>Fina Examination</u>	40%	Yes	Final Exam Period

Weekly Projects

Due: **Weekly**

Weighting: **30%**

Projects and test questions during each workshop in weeks 3-13. The first workshop will start in week 3 after an introduction to the unit and Matlab Simulink environment. The students can work in teams of two but they have to prepare project reports individually.

On successful completion you will be able to:

- Demonstrated ability to work with the specialised Matlab toolboxes such as Simulink, LTE toolbox and 5G toolbox to characterise telecommunications system performance.
- Demonstrated understanding of block-based modelling of telecommunications systems.
- Demonstrated ability in the following areas of professional engineering practice: Ability to work in teams, analytical thinking, self-motivation and self-learning.

Hurdle Test

Due: **Week 3**

Weighting: **5%**

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

There will be an in-class test in week 3 worth 5%. The test will take 30 minutes, and all will take place in the lecture room on Thursday March 14 at 1pm. The test will be on basic Matlab knowledge. This test is a hurdle requirement. A grade of 60% or more in this test is a condition of passing this unit.

On successful completion you will be able to:

- Demonstrated ability to work with the specialised Matlab toolboxes such as Simulink, LTE toolbox and 5G toolbox to characterise telecommunications system performance.

Mid-Semester Test

Due: **Week 7**

Weighting: **25%**

The mid-semester test will take place on Thursday April 11 at 1pm. It will be a 60 minute test. The test will be on the content covered by week 6.

On successful completion you will be able to:

- Demonstrated understanding of block-based modelling of telecommunications systems.
- Demonstrated understanding of key performance indicators of modern telecommunications systems such as delay, outage, bit error rates and capacity.
- Demonstrated understanding of main building blocks of modern telecommunications systems such as source/channel coding, modulation/demodulation and multiple access, and their roles in aggregate telecommunications performance.

Fina Examination

Due: **Final Exam Period**

Weighting: **40%**

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

Final exam. Students must obtain at least 40% on the end-semester test to pass the unit.

On successful completion you will be able to:

- Demonstrated understanding of block-based modelling of telecommunications systems.
- Demonstrated understanding of key performance indicators of modern telecommunications systems such as delay, outage, bit error rates and capacity.
- Demonstrated understanding of main building blocks of modern telecommunications systems such as source/channel coding, modulation/demodulation and multiple access, and their roles in aggregate telecommunications performance.
- Demonstrated understanding of main telecommunications resources such as frequency, power and space, and fundamental tradeoffs among them.

Delivery and Resources

There is no required textbook in the unit. Necessary and sufficient material will be covered during the lectures and workshop hours.

The following open-source references on Matlab are highly recommended:

- *Communications Toolbox: Getting Started Guide*, MathWorks, 2018.

- *Communications Toolbox: User Guide*, MathWorks, 2018.

The unit will be project based and the emphasis on theory will be minimal. The following references are useful for some basic background material:

- *Communication Systems*, 5th ed., S. Haykin and M. Moher, John Wiley & Sons, 2009.
- *Modern Digital and Analog Communication Systems*, 4th ed., B. P. Lathi and Z. Ding, Oxford University Press, 2009.
- *Principles of Digital Communication*, 1st ed., R. G. Gallager, Cambridge University Press, 2008.

Software

Matlab 2018b & Simulink by MathWorks are required. The required software will be available in the workshop computers. It can also be downloaded for home installation after registering for an online account with MathWorks - [mathworks.com](https://www.mathworks.com). For more information, please see:

<https://staff.mq.edu.au/intranet/science-and-engineering/services-and-resources/it-support-services/miscellaneous/matlab>

Unit Web Page

Unit lecture notes, resources and other information about the unit can be accessed through iLearn.

Technology used

The primary software tool used in workshops is Matlab. In addition to Matlab, standard library/ internet search engines and word processing software will be used.

Workshop Session Safety

NO FOOD OR DRINK may be taken into the laboratory.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). 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](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

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

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/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 improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

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.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcome

- Demonstrated ability in the following areas of professional engineering practice: Ability to work in teams, analytical thinking, self-motivation and self-learning.

Assessment task

- Weekly Projects

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Demonstrated ability to work with the specialised Matlab toolboxes such as Simulink, LTE toolbox and 5G toolbox to characterise telecommunications system performance.
- Demonstrated understanding of block-based modelling of telecommunications systems.
- Demonstrated understanding of key performance indicators of modern telecommunications systems such as delay, outage, bit error rates and capacity.
- Demonstrated understanding of main building blocks of modern telecommunications

systems such as source/channel coding, modulation/demodulation and multiple access, and their roles in aggregate telecommunications performance.

- Demonstrated understanding of main telecommunications resources such as frequency, power and space, and fundamental tradeoffs among them.

Assessment tasks

- Weekly Projects
- Hurdle Test
- Mid-Semester Test
- Final Examination

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Demonstrated ability to work with the specialised Matlab toolboxes such as Simulink, LTE toolbox and 5G toolbox to characterise telecommunications system performance.
- Demonstrated understanding of block-based modelling of telecommunications systems.
- Demonstrated understanding of key performance indicators of modern telecommunications systems such as delay, outage, bit error rates and capacity.
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- Demonstrated understanding of main telecommunications resources such as frequency, power and space, and fundamental tradeoffs among them.
- Demonstrated ability in the following areas of professional engineering practice: Ability to work in teams, analytical thinking, self-motivation and self-learning.

Assessment tasks

- Weekly Projects
- Hurdle Test
- Mid-Semester Test
- Final Examination

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Demonstrated ability to work with the specialised Matlab toolboxes such as Simulink, LTE toolbox and 5G toolbox to characterise telecommunications system performance.
- Demonstrated understanding of block-based modelling of telecommunications systems.
- Demonstrated understanding of key performance indicators of modern telecommunications systems such as delay, outage, bit error rates and capacity.
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- Demonstrated understanding of main telecommunications resources such as frequency, power and space, and fundamental tradeoffs among them.

Assessment tasks

- Weekly Projects
- Hurdle Test
- Mid-Semester Test
- Final Examination

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcome

- Demonstrated ability in the following areas of professional engineering practice: Ability to work in teams, analytical thinking, self-motivation and self-learning.

Assessment task

- Weekly Projects

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcome

- Demonstrated ability in the following areas of professional engineering practice: Ability to work in teams, analytical thinking, self-motivation and self-learning.

Assessment task

- Weekly Projects