



# TELE8087

## Mobile Networks and Security

Session 1, Special circumstances 2021

*School of Engineering*

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#### **Disclaimer**

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#### **Notice**

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

## General Information

Unit convenor and teaching staff

Lecturer

Stephen Hanly

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44 Waterloo Road room 108

appointment via email

Credit points

10

Prerequisites

Admission to MEngElecEng

Corequisites

Co-badged status

Unit description

This unit explores mobile communications-cellular principals and fundamentals for cellular network technology (5G and future networks). Topics include small-scale fading, multiple access techniques, the air interface model, network architectures, network design and cell planning, network management and operations, multilayered and multi radio access technologies (RAT), and interference management, Inter-RAT handover between different layers and technologies, the 5G standard, network security.

## 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:** Solve path-loss and link budget calculations for Heterogeneous cellular systems

**ULO2:** Solve mobility and handover problems for cellular systems

**ULO3:** Demonstrate an understanding of cell association in HetNets.

**ULO4:** Integrate advanced concepts to design a HetNet system to meet system-level constraints

**ULO5:** Critique relevant literature and write a research-level review article

**ULO6:** Demonstrate proficiency in areas of professional engineering practice, including self motivation and self learning, production of quality work to meet a given deadline

## General Assessment Information

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 submissions of assignments will attract a penalty of 10% of the marks per day. Extenuating circumstances will be considered upon lodgement of an application for special consideration. Resubmissions are not allowed.

The participation will be based on a short 5 minute presentation uploaded to ilearn, but available to all students for on-line viewing.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Assignments</u>	30%	No	Weeks 4, 7 and 10
<u>Participation</u>	10%	No	Week 11
<u>Mobile Networks Project Report</u>	30%	No	Week 12
<u>Final Examination</u>	30%	No	Final exam period

## Assignments

Assessment Type <sup>1</sup>: Problem set

Indicative Time on Task <sup>2</sup>: 18 hours

Due: **Weeks 4, 7 and 10**

Weighting: **30%**

In session small assignments (3) assessing quantitative and qualitative mobile networks principles

On successful completion you will be able to:

- Solve path-loss and link budget calculations for Heterogeneous cellular systems
- Solve mobility and handover problems for cellular systems
- Demonstrate an understanding of cell association in HetNets.
- Demonstrate proficiency in areas of professional engineering practice, including self motivation and self learning, production of quality work to meet a given deadline

## Participation

Assessment Type <sup>1</sup>: Participatory task

Indicative Time on Task <sup>2</sup>: 5 hours

Due: **Week 11**

Weighting: **10%**

In-class participation in interactive model

On successful completion you will be able to:

- Solve path-loss and link budget calculations for Heterogeneous cellular systems
- Solve mobility and handover problems for cellular systems
- Demonstrate an understanding of cell association in HetNets.
- Integrate advanced concepts to design a HetNet system to meet system-level constraints

## Mobile Networks Project Report

Assessment Type <sup>1</sup>: Project

Indicative Time on Task <sup>2</sup>: 18 hours

Due: **Week 12**

Weighting: **30%**

Project on mobile networks and network security

On successful completion you will be able to:

- Demonstrate an understanding of cell association in HetNets.
- Integrate advanced concepts to design a HetNet system to meet system-level constraints

- Critique relevant literature and write a research-level review article
- Demonstrate proficiency in areas of professional engineering practice, including self motivation and self learning, production of quality work to meet a given deadline

## Final Examination

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 18 hours

Due: **Final exam period**

Weighting: **30%**

Final examination in exam period.

On successful completion you will be able to:

- Solve path-loss and link budget calculations for Heterogeneous cellular systems
- Solve mobility and handover problems for cellular systems
- Demonstrate an understanding of cell association in HetNets.
- Integrate advanced concepts to design a HetNet system to meet system-level constraints
- Critique relevant literature and write a research-level review article

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<sup>1</sup> 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.

<sup>2</sup> 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

There will be a sequence of on-line lectures uploaded to ilearn each week. There will be weekly workshops for practice problem solving. These will be held on-line on zoom. Lecture notes, problem sheets, including problems for assessment, will be posted to ilearn.

Reference material will be made available on closed reserve in the library. References are:

"Wireless Communications: Principles and Practice", by Theodore Rappaport (Prentice Hall)

"Wireless Communications" by Andrea Goldsmith (Cambridge University Press)

"LTE-The UMTS Long Term Evolution: From Theory to Practice" (2nd Edition) by Stefania Sesia, Issam Toufik and Matthew Baker

"Millimeter Wave Wireless Communications" by Theodore Rappaport, Robert Heath, Robert Daniels and James Murdock (Prentice Hall)

"Computer Networks: A Top-Down Approach" by James Kurose and Keith Ross (Addison Wesley)

## 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](#)
- [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 \(https://students.mq.edu.au/support/study/policies\)](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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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](http://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](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/](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.