



# ELEC2040

## Signals and Systems

Session 1, Weekday attendance, North Ryde 2020

*School of Engineering*

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## General Information

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Credit points

10

Prerequisites

MATH1020 or MATH1025 or MATH133 or MATH136

Corequisites

Co-badged status

Unit description

The aim of this unit is to give students a comprehensive introduction to the theory of signal processing and analysis that is used in many areas of electronic and telecommunications engineering including: circuit analysis; amplifiers and electronic systems; analogue and digital communications; audio and image processing; and control systems. The unit covers time and frequency analysis for both continuous-time and discrete-time signals. Topics covered in the unit include: linear time-invariant systems; convolution; Fourier series; Fourier transforms; Laplace Transforms; Discrete Fourier transforms; and Z transforms.

## 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 signal processing problems involving complex numbers

**ULO2:** demonstrate how signals can be scaled in space, time, flipped in time (time-

reversed), delayed (right and left shifted), and to compute other signal properties (mean, energy, power, periodicity).

**ULO3:** articulate well developed knowledge of the concept of a linear time-invariant system and the concept of the convolution of two signals.

**ULO4:** articulate the concept of signal domains: how the same signal can be represented in different domains (in time or in frequency) and how to transform from one representation to another.

**ULO5:** Illustrate the role of sampling and filtering in converting between continuous-time to discrete-time signals, including the Nyquist criterion, and concept of aliasing.

**ULO6:** use Matlab to solve problems in Signals and Systems

## Assessment Tasks

### Coronavirus (COVID-19) Update

Assessment details are no longer provided here as a result of changes due to the Coronavirus (COVID-19) pandemic.

Students should consult [iLearn](#) for revised unit information.

[Find out more about the Coronavirus \(COVID-19\) and potential impacts on staff and students](#)

## General Assessment Information

**Hurdle Quiz:** There will be a hurdle quiz in week 2 worth 3%. The quiz will take 30 minutes, and all will take place in the lecture room on Wednesday March 4 in the lecture slot. The quiz will be on basic introductory and prerequisite knowledge, which will have been reviewed in the first week of the unit. This quiz is a hurdle requirement for the unit. A grade of 60% or more in this quiz is a condition of passing this unit.

**Tests:** There will be four tests during the semester. The Tests have the following condition: If the mark is less than 50%, then the student will be given a second chance to achieve a mark of 50%, by completing extra assessment to a satisfactory standard. The extra assessment will be in the form of a take-home assignment, for which the student will need to achieve a mark of greater than 50%. If the assignment mark is not greater than 50%, then the original Test mark will stand.

**Projects** will be undertaken during each practical session scheduled in weeks 1-13, and will be submitted at the end of the practical sessions. There will be a practical session in week 1.

**Final exam.** The final exam has a hurdle requirement. Students must obtain at least 40% on final exam to pass the unit.

## Delivery and Resources

### Coronavirus (COVID-19) Update

Any references to on-campus delivery below may no longer be relevant due to COVID-19.

Please check here for updated delivery information: [https://ask.mq.edu.au/account/pub/display/unit\\_status](https://ask.mq.edu.au/account/pub/display/unit_status)

Many textbooks provide comprehensive coverage of the material in this unit. We will be referring to the following two books as we progress through the unit:

“Signals and systems”, S. Haykin and B. Van Veen, John Wiley & Sons, second edition. 2003.

“Signals & Systems”, A. V. Oppenheim and A. S. Willsky with S. H. Nawab, Prentice-Hall, second edition, 1997.

These books are on closed reserve in the library.

Other books include:

“Signals, Systems and Transforms” 4th ed, by Phillips, Parr and Riskin. Pearson publishers. 2008.

“Signals and systems”, M. J. Roberts, McGraw-Hill.2004.

“An Introduction to Signals and Systems”, J. A. Stuller, Thomson publishers, 2008.

“Linear Systems and Signals”, 2nd ed, B. P. Lathi, Oxford University Press, 2005.

“Discrete-time signal processing”, A. V. Oppenheim and R. W. Schafer with J. R. Buck, Prentice-Hall, 1999.

## 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.)*

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](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>).

## 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](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.

## Changes from Previous Offering

The previous offering was well received by students and minimal changes have been made this year. On the LEU Student Feedback survey last year there were 19 questions, and all questions received a response average score of 4.2 or above, out of 5, indicating that there are no areas where significant changes need to be made.