



# ELEC677

## Advanced Electronics Engineering

S1 Day 2019

*School of Engineering*

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## General Information

Unit convenor and teaching staff

Dushmantha Thalakatuna

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Credit points

4

Prerequisites

Admission to MEng

Corequisites

Co-badged status

ELEC476 ELEC876

Unit description

This unit integrates prior learning in a specialist area of engineering with problem solving, emerging technology and aspects of engineering application, technical reporting and self-management to prepare students to work at a professional capacity. The unit aims to address the application of fundamental principles and methods at an advanced level in the context of standards and practices, modelling, analysis, design and practical implementation. The unit also develops skills in the critical evaluation of information, software and sources of error and experimental methods. Learning will be achieved using case studies, laboratories, presentations, group work and traditional lecture format. The specific topics will focus on current advances in the area including advanced electronics systems such as PLLs, oscillators, analogue-to-digital conversion, power conversion and control, IC design, radio circuits and systems, RF measurements, and CAD.

## 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:

Apply circuit theory and EDA tools to design advanced electronic circuits.

Demonstrate proficiency in designing advanced circuits to meet functional specifications.

Engage in design review process in an engineering context.

Demonstrate self-learning, time management and project management skills.

## General Assessment Information

In order to pass this unit a student must obtain a mark of 50 or more overall or obtain a passing grade P/ CR/ D/ HD.

### Late submissions

Late submissions will get 10% mark deducted per day after the deadline.

## Assessment Tasks

| Name                             | Weighting | Hurdle | Due |
|----------------------------------|-----------|--------|-----|
| <u>Functional Specifications</u> | 10%       | No     | TBD |
| <u>Final Design Report</u>       | 30%       | No     | TBD |
| <u>Progress Review meetings</u>  | 20%       | No     | TBD |
| <u>Laboratory work</u>           | 15%       | No     | TBD |
| <u>Final examination</u>         | 25%       | No     | TBD |

### Functional Specifications

Due: **TBD**

Weighting: **10%**

The aim of this project is to derive a functional specification for a LNA to be used in a given receiver. This is a group assignment and will be required to submit a report detailing derived specifications with justifications.

On successful completion you will be able to:

- Demonstrate proficiency in designing advanced circuits to meet functional specifications.
- Demonstrate self-learning, time management and project management skills.

### Final Design Report

Due: **TBD**

Weighting: **30%**

Students should design a LNA to meet the approved functional specifications. The final design needs to be submitted in a report including layout, simulation and compliance to specification. This is an individual assignment.

On successful completion you will be able to:

- Apply circuit theory and EDA tools to design advanced electronic circuits.

- Demonstrate proficiency in designing advanced circuits to meet functional specifications.
- Demonstrate self-learning, time management and project management skills.

## Progress Review meetings

Due: **TBD**

Weighting: **20%**

Students should present the progress of the LNA design fortnightly during lab sessions. The progress report slides should have max 3 slides and submitted prior to the labs. The details on submission times will be made available on iLearn.

On successful completion you will be able to:

- Apply circuit theory and EDA tools to design advanced electronic circuits.
- Demonstrate proficiency in designing advanced circuits to meet functional specifications.
- Engage in design review process in an engineering context.
- Demonstrate self-learning, time management and project management skills.

## Laboratory work

Due: **TBD**

Weighting: **15%**

Laboratories will be given to build up skills in several areas, including but not limited to, the proper advanced use of EDA/CAD tools to help with the final design. Reports are due 1 week after the Laboratory session.

On successful completion you will be able to:

- Demonstrate proficiency in designing advanced circuits to meet functional specifications.
- Demonstrate self-learning, time management and project management skills.

## Final examination

Due: **TBD**

Weighting: **25%**

A final two-hour open-book examination will be conducted in the formal examination period to test competency and understanding of the theory learnt in lectures and labs.

On successful completion you will be able to:

- Apply circuit theory and EDA tools to design advanced electronic circuits.
- Demonstrate self-learning, time management and project management skills.

## Delivery and Resources

### Text Books:

Michael Steer, "Microwave and RF Design, A Systems Approach".

### Notes:

Lecture notes will be provided.

### EDA tools:

AWR will be provided for simulations.

### Consultation hour:

This will be posted on iLearn.

## Unit Schedule

Refer to iLearn and lecture notes for the unit schedule.

## 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 \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](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 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](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.

## Graduate Capabilities

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate proficiency in designing advanced circuits to meet functional specifications.
- Engage in design review process in an engineering context.

## **Assessment task**

- Final Design Report

## **Capable of Professional and Personal Judgement and Initiative**

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

## **Learning outcome**

- Demonstrate self-learning, time management and project management skills.

## **Assessment tasks**

- Final Design Report
- Progress Review meetings
- Laboratory work

## **Commitment to Continuous Learning**

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

## **Learning outcome**

- Demonstrate self-learning, time management and project management skills.

## **Assessment tasks**

- Final Design Report
- Laboratory work

## Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

### Learning outcome

- Apply circuit theory and EDA tools to design advanced electronic circuits.

### Assessment tasks

- Functional Specifications
- Final Design Report
- Final examination

## Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

### Assessment tasks

- Functional Specifications
- Final Design Report

## Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

### Learning outcomes

- Apply circuit theory and EDA tools to design advanced electronic circuits.



- Demonstrate proficiency in designing advanced circuits to meet functional specifications.
- Engage in design review process in an engineering context.

### **Assessment tasks**

- Functional Specifications
- Final Design Report
- Final examination

## **Effective Communication**

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

### **Learning outcome**

- Engage in design review process in an engineering context.

### **Assessment tasks**

- Final Design Report
- Progress Review meetings