# ELEC8870

## High Performance IC Design

Session 2, Weekday attendance, North Ryde 2020

*School of Engineering*

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**Notice**

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and ot her small group learning activities on campus for the second half-year, while keeping an online ver sion available for those students unable to return or those who choose to continue their studies onli ne.

To check the availability of face-to-face and onlin e activities for your unit, please go to timetable vi ewer. To check detailed information on unit asses sments visit your unit's iLearn space or consult yo ur unit convenor.

# General Information

Unit convenor and teaching staff
Unit Convener
David Niven
david.niven@mq.edu.au
Contact via appointment via email

Michael Heimlich
michael.heimlich@mq.edu.au

Credit points
10

Prerequisites
Admission to MEngElecEng and 30cp at 3000 level or above

Corequisites

Co-badged status

Unit description
From modern telecommunications to tablet computing and from mobile handsets to the cloud, the limits of integrated circuit technology are being pushed to the limits of what is possible in terms of speed, size, and power. Beyond the IC itself, packaging concerns, both electrical and thermal, provide additional constraints in the design of the modern high performance integrated circuit. This unit will be taught from the research of both resident and visiting staff as well as from the latest research around the world.

## 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:** Develop an understanding of different semiconductor technologies

**ULO2:** Develop proficiency in using standard electronic design automation (EDA) tools for IC design

**ULO3:** Perform integrated circuit (IC) design in a commercially used semiconductor technology

**ULO4:** Develop an understanding of the technical concept required for implementing various high frequency on-chip active and passive circuits

**ULO5:** Demonstrate self-learning, time-management, technical report writing, project management (individually and as a group)

# General Assessment Information

**Conditions required to pass the unit: eg:**

**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).

For further details about grading, please refer below in the policies and procedures section.

Each unit guide where there is a **final exam** must provide information on supplementary exams. Please include this wording:

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.

All information are here in: https://wiki.mq.edu.au/pages/viewpage.action?spaceKey=engineering&title=Unit+Guides%3A+Preparing+and+Checking

# Assessment Tasks

| Name | Weighting | Hurdle | Due |
|---|---|---|---|
| Lab participation | 10% | No | 30/10/2020 |
| Assignment | 20% | No | 23/10/2020 |
| Final examination | 30% | No | TBA |
| Quizzes | 20% | No | 16/10/2020 |
| Lab report | 20% | No | 30/10/2020 |

## Lab participation

Assessment Type [1]: Design Task
Indicative Time on Task [2]: 0 hours

Due: **30/10/2020**
Weighting: **10%**

Active and passive circuit implementation in the practical activities. Participation workload is assumed to take place inside the schedule teaching activity.

On successful completion you will be able to:

- Develop proficiency in using standard electronic design automation (EDA) tools for IC design
- Perform integrated circuit (IC) design in a commercially used semiconductor technology
- Demonstrate self-learning, time-management, technical report writing, project management (individually and as a group)

## Assignment

Assessment Type [1]: Report
Indicative Time on Task [2]: 20 hours
Due: **23/10/2020**
Weighting: **20%**

Demonstrate problem solving capabilities and critical thinking - (two assignments)

On successful completion you will be able to:

- Develop an understanding of different semiconductor technologies
- Perform integrated circuit (IC) design in a commercially used semiconductor technology
- Demonstrate self-learning, time-management, technical report writing, project management (individually and as a group)

## Final examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 28 hours
Due: **TBA**
Weighting: **30%**

Final examination held in the formal exam period.

On successful completion you will be able to:

- Develop an understanding of different semiconductor technologies
- Develop an understanding of the technical concept required for implementing various high frequency on-chip active and passive circuits
- Demonstrate self-learning, time-management, technical report writing, project management (individually and as a group)

## Quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 20 hours
Due: **16/10/2020**
Weighting: **20%**

Multiple choice questions based on the content taught in lectures. A total of two quizzes.

On successful completion you will be able to:

- Develop an understanding of different semiconductor technologies
- Develop an understanding of the technical concept required for implementing various high frequency on-chip active and passive circuits
- Demonstrate self-learning, time-management, technical report writing, project management (individually and as a group)

## Lab report

Assessment Type [1]: Lab report
Indicative Time on Task [2]: 20 hours
Due: **30/10/2020**
Weighting: **20%**

Two lab reports on design works

On successful completion you will be able to:

- Develop proficiency in using standard electronic design automation (EDA) tools for IC design
- Perform integrated circuit (IC) design in a commercially used semiconductor technology

- Develop an understanding of the technical concept required for implementing various high frequency on-chip active and passive circuits
- Demonstrate self-learning, time-management, technical report writing, project management (individually and as a group)

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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

AWR software is required for this unit. The labs will have access to the software and copies for personal laptops can be obtained.

No textbooks are required. There are a number of reference books available: • I. D. Robertson and S. Lucyszyn (Eds), "RFIC and MMIC Design and Technology," The Institution of Engineering and Technology (IET), 2011. • David M Pozar, "Microwave Engineering," Wiley • Michael Steer, “Microwave and RF Design, A Systems Approach”

Other useful readings: — Sedra & Smith, “Microelectronic Circuits,” Cambridge University Press. — iLearn links: Technical Papers, Application Notes. — IEEE Xplore: The most reliable source for technical papers.

# 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). 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). 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).

### 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 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

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.