ELEC8870

High Performance IC Design

Session 2, In person-scheduled-weekday, North Ryde 2024

School of Engineering

Contents

General Information

Unit convenor and teaching staff Darren Bagnall darren.bagnall@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)

Assessment Tasks

Name	Weighting	Hurdle	Due
Lab participation	5%	No	n/a
Design Presentation	15%	No	Week 13
Lab report	15%	No	Week 8
Final examination	50%	No	exam period (tbd)
Assignment	15%	No	Week 5

Lab participation

Assessment Type [1]: Design Task
Indicative Time on Task [2]: 0 hours
Due: **n/a**
Weighting: **5%**

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)

Design Presentation

Assessment Type [1]: Presentation
Indicative Time on Task [2]: 12 hours
Due: **Week 13**
Weighting: **15%**

Powerpoint or other suitable format presentation on the final design task.

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)

Lab report

Assessment Type [1]: Lab report
Indicative Time on Task [2]: 12 hours
Due: **Week 8**
Weighting: **15%**

Three 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)

Final examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 49 hours
Due: **exam period (tbd)**
Weighting: **50%**

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)

Assignment

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 12 hours
Due: **Week 5**
Weighting: **15%**

Assignments based on lecture material

On successful completion you will be able to:

- Develop an understanding of different semiconductor technologies
- 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

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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

The unit will be delivered through information provided in iLEARN, in the weekly lecture and in the 3 hour lab scheduled each week.

Students should bring note paper for lectures, and ideally a laptop for lab work,

Methods of Communication

- We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to ELEC8870@mq.edu.au from your **university email** address.

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://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
- Assessment Procedure
- Complaints Resolution 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). 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) 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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and

courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the 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

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

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.

Changes from Previous Offering

Unit information based on version 2024.01R of the Handbook