ELEC476

Advanced Electronics Engineering

S1 Day 2017

Dept of Engineering

Contents

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General Information

Unit convenor and teaching staff
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Credit points
3

Prerequisites
(60cp at 100 level or above) including ((ELEC342 or ELEC343) and ELEC376)

Corequisites

Co-badged status
ELEC677

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:

Understand operation of MOSFETs and their mathematical models.

Apply understanding of MOSFET operation for design of CMOS logic circuits

Ability to simulate and design digital CMOS circuits using EDA tools

Apply MOSFET understanding to analog circuits

Understand the concepts of feedback and noise in analog circuits

Ability to simulate and design analog CMOS circuits using EDA tools

Assessment Tasks

Name	Weighting	Hurdle	Due
Home Assignments	15%	No	TBD
In-Class Mid Term Test	25%	No	TBD
Final Exam	40%	No	TBD
Practicals	20%	No	TBD

Home Assignments

Due: **TBD**
Weighting: **15%**

Assignments will be given for each module of this course. Students will submit answers to the questions asked in assignments.

On successful completion you will be able to:
- Understand operation of MOSFETs and their mathematical models.
- Apply understanding of MOSFET operation for design of CMOS logic circuits
- Apply MOSFET understanding to analog circuits
- Understand the concepts of feedback and noise in analog circuits

In-Class Mid Term Test

Due: **TBD**
Weighting: **25%**

In-class test at the mid term.

On successful completion you will be able to:
- Understand operation of MOSFETs and their mathematical models.
- Apply understanding of MOSFET operation for design of CMOS logic circuits
- Apply MOSFET understanding to analog circuits
- Understand the concepts of feedback and noise in analog circuits

Final Exam

Due: **TBD**

Weighting: **40%**

3 hours final exam.

On successful completion you will be able to:

- Understand operation of MOSFETs and their mathematical models.
- Apply understanding of MOSFET operation for design of CMOS logic circuits
- Apply MOSFET understanding to analog circuits
- Understand the concepts of feedback and noise in analog circuits

Practicals

Due: **TBD**

Weighting: **20%**

Practicals will be on simulations using EDA tools on different modules. Students should submit reports on the laboratory/simulation work.

Format for reports will be given in iLearn.

On successful completion you will be able to:

- Ability to simulate and design digital CMOS circuits using EDA tools
- Ability to simulate and design analog CMOS circuits using EDA tools

Delivery and Resources

Text Books:

Sedra and Smith "Microelectronic Circuits", Cambridge University Press.

Ben G. Streetman and S. Banerjee "Solid State Electronics Devices", Pearson

Reference Books:

Series of engineering journal references

Notes:

Lecture notes will be provided

EDA tools:

AWR will be provided for simulations

Unit Schedule

Check in iLearn

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration

In addition, a number of other policies can be found in the Learning and Teaching Category of 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/support/student_conduct/

Results

Results shown in *iLearn*, 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.

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 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

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.

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

- Apply understanding of MOSFET operation for design of CMOS logic circuits
- Ability to simulate and design digital CMOS circuits using EDA tools
- Apply MOSFET understanding to analog circuits
- Understand the concepts of feedback and noise in analog circuits

Assessment tasks

- Home Assignments
- In-Class Mid Term Test
- Final Exam
- Practicals

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 outcomes

- Understand operation of MOSFETs and their mathematical models.
- Apply understanding of MOSFET operation for design of CMOS logic circuits
- Ability to simulate and design digital CMOS circuits using EDA tools
- Apply MOSFET understanding to analog circuits
- Understand the concepts of feedback and noise in analog circuits
- Ability to simulate and design analog CMOS circuits using EDA tools

Assessment tasks

- Home Assignments
- In-Class Mid Term Test
- Final Exam
- Practicals

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:

Learning outcomes

- Understand the concepts of feedback and noise in analog circuits
- Ability to simulate and design analog CMOS circuits using EDA tools

Assessment tasks

- Home Assignments
- In-Class Mid Term Test
- Final Exam
- Practicals

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

- Understand operation of MOSFETs and their mathematical models.
- Apply understanding of MOSFET operation for design of CMOS logic circuits
- Ability to simulate and design digital CMOS circuits using EDA tools
- Apply MOSFET understanding to analog circuits
- Understand the concepts of feedback and noise in analog circuits
- Ability to simulate and design analog CMOS circuits using EDA tools

Assessment tasks

- Home Assignments
- In-Class Mid Term Test
- Final Exam
- Practicals

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 outcomes

- Ability to simulate and design digital CMOS circuits using EDA tools
- Ability to simulate and design analog CMOS circuits using EDA tools

Assessment task

- Practicals

Changes from Previous Offering

Learning outcomes have been revised.

Assessments have been revised.