

ELEC876 Advanced Electronics Engineering

S1 Day 2018

Dept of Engineering

Contents

General Information	2
Learning Outcomes	3
General Assessment Information	3
Assessment Tasks	3
Delivery and Resources	4
Unit Schedule	5
Policies and Procedures	5
Graduate Capabilities	6
Changes from Previous Offering	8

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff Unit convener Sourabh Khandelwal sourabh.khandelwal@mq.edu.au Contact via Email Room 131, 7 Wally's Walk Friday 2-3 pm

Tutor Surya Sharma surya.sharma@mq.edu.au Contact via Email 7 Wally's Walk NA

Credit points

4

Prerequisites Admission to MEng and ELEC643 and ELEC676

Corequisites

Co-badged status ELEC476

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 selfmanagement 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 noise in MOSFETs and its implication on analog circuits

Ability to simulate and design analog CMOS circuits using EDA tools

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.

Reports

Late submission on lab reports will get 10% mark deducted per day after the deadline

Assessment Tasks

Name	Weighting	Hurdle	Due
In-Class Mid Term Test	25%	No	Week6 or Week7
Final Exam	40%	No	TBD
Practicals	35%	No	Biweekly

In-Class Mid Term Test

Due: Week6 or Week7 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 noise in MOSFETs and its implication on 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 noise in MOSFETs and its implication on analog circuits

Practicals

Due: **Biweekly** Weighting: **35%**

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:

- · 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 noise in MOSFETs and its implication on analog circuits
- 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/Resources:

Series of engineering journal references

Notes:

Lecture notes will be provided

EDA tools:

AWR will be provided for simulations

Consultation hour:

This will be posted on iLearn

Unit Schedule

Check in iLearn

Policies and Procedures

Macquarie University policies and procedures are accessible from <u>Policy Central (https://staff.m</u> <u>q.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-centr</u> <u>al</u>). 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
- <u>Special Consideration Policy</u> (*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 <u>Student Policy Gateway</u> (htt <u>ps://students.mq.edu.au/support/study/student-policy-gateway</u>). 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 (http://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 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 <u>eStudent</u>. For more information visit <u>ask.m</u> <u>q.edu.au</u>.

Student Support

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

Learning Skills

Learning Skills (<u>mq.edu.au/learningskills</u>) 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 <u>http://www.mq.edu.au/about_us/</u>offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the <u>Acceptable Use of IT Resources Policy</u>. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

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 noise in MOSFETs and its implication on analog circuits

· Ability to simulate and design analog CMOS circuits using EDA tools

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

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 noise in MOSFETs and its implication on analog circuits
- · Ability to simulate and design analog CMOS circuits using EDA tools

Assessment tasks

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

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

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 noise in MOSFETs and its implication on analog circuits
- · Ability to simulate and design analog CMOS circuits using EDA tools

Assessment tasks

In-Class Mid Term Test

- Final Exam
- Practicals

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

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

Assessment tasks

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

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Assessment task

Practicals

Changes from Previous Offering

Content of selected topics has been reduced, based on feedback.

Tutorials have been added, also based on feedback.