



ELEC3076

Electronic Devices and Systems

Session 2, Weekday attendance, North Ryde 2021

School of Engineering

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Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of [units with mandatory on-campus classes/teaching activities](#).

Visit the [MQ COVID-19 information page](#) for more detail.

General Information

Unit convenor and teaching staff

Unit Convenor, Lecturer

Binesh Puthen Veettil

binesh.puthenveettil@mq.edu.au

362, 9WW

Mondays 11AM-1PM (via zoom). Please check iLearn

Co-convenor, Lecturer

David Payne

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Fridays 1PM-3PM (via zoom). Please check iLearn

Credit points

10

Prerequisites

((ELEC2005 or ELEC2075 or ELEC275) and 130cp at 1000 level or above) or admission to MEngElecEng

Corequisites

Co-badged status

Unit description

This unit builds on linear and nonlinear circuit design, and further develops the topics of analogue circuit theory and practice with an emphasis on the circuit and system design. It covers semiconductor devices, circuit simulations, transistor amplifiers, operational-amplifiers, mixers and power amplifiers. It will also deal with advanced topics which may include noise and non-linear design issues. Students will get hands-on experience in designing and building small signal amplifiers, power amplifiers and mixers as well as working with professional software packages for circuit design and analysis.

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:** explain basic semiconductor devices, their operation and non-linear behaviour
- ULO2:** apply nonlinear device concepts to design and analyse transistor amplifiers
- ULO3:** apply mathematical methods to analyse nonlinear electronic systems in the frequency domain
- ULO4:** analyse the operation of power amplifiers in the time and frequency domains
- ULO5:** design, simulate, implement, test and debug electronic circuits and systems
- ULO6:** demonstrate active self-learning, critical thinking, problem-solving, technical writing and time-management skills, individually and in a team.

General Assessment Information

- Late submission of lab reports will normally attract a penalty of reduced marks. Normally, 50% marks per day is the penalty for reports submitted after the due date. Assignments will auto-submit at the due date and further modifications will not be possible.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Pre-classroom online quiz</u>	5%	No	Ends before each week's lectorial
<u>Class test</u>	5%	No	check iLearn
<u>Take-home assignment</u>	20%	No	check iLearn
<u>Final examination</u>	40%	No	TBA
<u>Laboratory</u>	15%	No	check iLearn
<u>Lab report</u>	15%	No	check iLearn

Pre-classroom online quiz

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 3 hours

Due: **Ends before each week's lectorial**

Weighting: **5%**

Students are expected to go through the online learning content, understand the theory and attempt the online quiz each week before attending the classroom activities of that week.

On successful completion you will be able to:

- explain basic semiconductor devices, their operation and non-linear behaviour
- apply nonlinear device concepts to design and analyse transistor amplifiers
- apply mathematical methods to analyse nonlinear electronic systems in the frequency domain
- analyse the operation of power amplifiers in the time and frequency domains
- demonstrate active self-learning, critical thinking, problem-solving, technical writing and time-management skills, individually and in a team.

Class test

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 1 hours

Due: **check iLearn**

Weighting: **5%**

This is a one-hour open-book test conducted via iLearn during the regular lecture hour. There will be only one class test in total.

On successful completion you will be able to:

- explain basic semiconductor devices, their operation and non-linear behaviour
- apply nonlinear device concepts to design and analyse transistor amplifiers
- apply mathematical methods to analyse nonlinear electronic systems in the frequency domain
- analyse the operation of power amplifiers in the time and frequency domains

Take-home assignment

Assessment Type ¹: Problem set

Indicative Time on Task ²: 8 hours

Due: **check iLearn**

Weighting: **20%**

Take-home assignments mainly consist of numerical problems on the concepts learned. The answers are to be submitted online via iLearn. There will be four assignments in total.

On successful completion you will be able to:

- explain basic semiconductor devices, their operation and non-linear behaviour
- apply nonlinear device concepts to design and analyse transistor amplifiers
- apply mathematical methods to analyse nonlinear electronic systems in the frequency domain
- analyse the operation of power amplifiers in the time and frequency domains
- demonstrate active self-learning, critical thinking, problem-solving, technical writing and time-management skills, individually and in a team.

Final examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 2 hours

Due: **TBA**

Weighting: **40%**

A final examination will be conducted during the formal examination period. This examination will assess all topics discussed in the unit unless otherwise specified.

On successful completion you will be able to:

- explain basic semiconductor devices, their operation and non-linear behaviour
- apply nonlinear device concepts to design and analyse transistor amplifiers
- apply mathematical methods to analyse nonlinear electronic systems in the frequency domain
- analyse the operation of power amplifiers in the time and frequency domains
- demonstrate active self-learning, critical thinking, problem-solving, technical writing and time-management skills, individually and in a team.

Laboratory

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 4 hours

Due: **check iLearn**

Weighting: **15%**

The experiments are designed to explore the practical aspects of the theory discussed in the unit. There are four lab modules in total. Marks are awarded for the pre-lab work, maintaining an up-to-date lab book, active participation in the lab, and the demonstration of results. Labs will be conducted in the electronics laboratory (circuit implementation and testing).

On successful completion you will be able to:

- design, simulate, implement, test and debug electronic circuits and systems
- demonstrate active self-learning, critical thinking, problem-solving, technical writing and time-management skills, individually and in a team.

Lab report

Assessment Type ¹: Lab report

Indicative Time on Task ²: 6 hours

Due: **check iLearn**

Weighting: **15%**

Students are required to submit two individually written reports on two of the four lab modules. Lab reports will be assessed on the basis of originality, format, clarity, relevance, analysis of the results and the quality of technical writing.

On successful completion you will be able to:

- design, simulate, implement, test and debug electronic circuits and systems
- demonstrate active self-learning, critical thinking, problem-solving, technical writing and time-management skills, individually and in a team.

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

Recommended texts:

Sedra and Smith- Microelectronic Circuits 6th Edition. The material will also cover other books and journal articles. Reading recommendations will be provided through iLearn.

Technology used:

Classrooms lectures+tutorials (called lectorials) will be conducted online via Zoom. All the

learning and assessment resources will be made available on iLearn.

Typical electronic and electrical instruments such as voltage and current sources, voltmeters, ammeters, oscilloscopes and spectrum analysers will be used in the lab. For circuit simulation, LTSPICE software will be used.

You will need a logbook (a bound notebook only for this purpose and no loose sheets) for the lab.

You will need a calculator for various numerical exercises throughout the session. **Note that only calculators with no text-recall function are permitted for the final exam.**

Unit Schedule

A detailed schedule is available on the iLearn page. Note that there will be **no laboratory session in week1.**

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](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](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](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 \(https://policies.mq.edu.au\)](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

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.

Changes from Previous Offering

More training videos and example questions are added to the learning content based on last year's popular demand.