

# Analogue Electronics - Course Outline

## ECEN 303: 2016 Trimester 1

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This document sets out the workload and assessment requirements for ECEN 303. It also provides contact information for staff involved in the course. If the contents of this document are altered during the course, you will be advised of the change by an announcement in lectures and/or on the course web site. A printed copy of this document is held in the School Office.

### Objectives

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The prime purpose of ECEN303 (and PHYS341) is to teach students to design analogue circuits for use in scientific instrumentation, data acquisition, and communications. A considerable emphasis is placed on design skills.

This course contributes to the graduate attributes of the BE as indicated below. By the end of the course, students should be able to:

1. Analyse the operation of a range of analogue circuits including amplifiers, filters, oscillators and power supplies. [3\(b\)](#).
2. Design standard analogue electronic circuits with regard to practical considerations, such as component imperfections and thermal management. [3\(b\)](#), [3\(e\)](#).
3. Design and demonstrate the operation of a complex analogue system. [3\(b\)](#), [3\(d\)](#), [3\(f\)](#).
4. Use modern test equipment and design tools in the the design and testing of electronic systems. [3\(b\)](#), [3\(f\)](#).

Particular Topics covered in the course include

- Operational Amplifiers Circuits
- Printed Circuit Board Design
- Operational Amplifier Imperfections
- Operational Amplifier Internals
- Stability in Operational Amplifier circuits
- Filters
- Power supplies
- Power amplifiers
- Positive Feedback circuits
- Oscillators
- Thermal management
- Comparators

### Textbook

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The recommended textbook for ECEN 303 is "Design with Operational Amplifiers and Analog Integrated Circuits" (3rd edition) by Sergio Franco. Two other useful texts for the course are Sedra & Smith, "Microelectronic Circuits" (4th or 5th edition), and Horowitz & Hill, "The Art of Electronics," (2nd or 3rd edition) both available in the University bookshop (or 2nd hand for older editions). These texts are available on closed reserve in the library.

### Lectures, Tutorials and Laboratories

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A [schedule](#) of lecture topics, readings, and assignment due dates is available online.

Classes for ECEN 303 are held from 29 February to 23 March, 31 March to 22 April, and 2 May to 3 June at the following times:

Lectures: Mondays at 11:00 in HMLT103 and Tuesdays at 11:00 in EALT206. Note: Lectures during week one (29/2–4/3) are held in CO250.

Tutorials: Thursdays at 11:00 in HMLT103.

Labs: one three-hour session per week, either on Mondays between 12:00 and 15:00, or on Tuesdays between 13:00 and 16:00. Both sessions are held in CO250. Time in the labs will be split between individual exercises and the group design project.

The course runs from 29 Feb – 23 Mar and from 31 Mar – 22 Apr and from 2 May – 3 Jun 2016.

### Assignments

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Assignments will be distributed in the Monday lectures during weeks 1, 2, 4, and 6–10. They will be due before the start of the Tuesday lecture in weeks 3, 4, 6, and 7–11. Assignments should be submitted to the ECEN303 hand-in box located in CO250.

## Project

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A project will be given out during lectures in week 2. It will contain milestones that will be due in weeks 3, 5, and 9. Work will be completed in groups of 2, expect for the final report, which is an individual exercise.

## Workload

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In order to maintain satisfactory progress in ECEN 303, you should plan to spend an average of at least 10 hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures and tutorials: 3
- Readings: 2
- Assignments: 1
- Labs/project: 4

## School of Engineering and Computer Science

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The School office is located on level three of the Cotton Building (Cotton 358).

The notice board for ECEN 303 is located on the second floor of the Cotton Building.

## Staff

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The course coordinator for ECEN 303 is Ciaran Moore; lectures will be given by Ciaran Moore and Ramesh Rayudu. Their contact details are:

- *Ramesh Rayudu*
- AM421
- 463 5233 x8068
- Ramesh.Rayudu@ecs.vuw.ac.nz
  
- *Ciaran Moore*
- AM227
- +64 4 463 5233 x8931
- Ciaran.Moore@vuw.ac.nz

Your lab instructors and assignment markers are Hamish Colenso and Farzaneh Fadakar.

The class representative for ECEN 303 will be announced in week 2.

## Announcements and Communication

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The main means of communication outside of lectures will be the ECEN 303 web area at [http://ecs.victoria.ac.nz/Courses/ECEN303\\_2016T1/](http://ecs.victoria.ac.nz/Courses/ECEN303_2016T1/). There you will find, among other things, this document, the lecture schedule and assignment handouts, and the ECEN 303 Forum. The forum is a web-based bulletin board system. Questions and comments can be posted to the forum, and staff will read these posts and frequently respond to them.

## Assessment

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Your grade for ECEN 303 will be determined based on the following assessment weightings:

Item	Weight	Objective
Assignments	24%	1-2
Design Project	30%	2-4
Research Presentation	6%	1
Final Examination (2 hours)	40%	1-2

Assignments will be weighted equally. Work submitted after the due date will incur a penalty. Marks will be deducted at a rate of 10% of the full mark for each working day late. Work submitted more than one working day after the deadline (for assignments) or more than five working days after the deadline (project milestones) will not be marked. Any work handed in after the model solutions have been made available will not be marked. Extensions will be given only in exceptional circumstances, and if agreed in writing before the due date. In the event of an aerotat application. regular submission of

assignments and performance over the course of the project will contribute substantially to the outcome.

## Tests and Exams

There is NO midterm test for ECEN 303.

The timetable for final examinations will be available from the University web site and will be posted on a notice board outside the faculty office. The final examination will be three hours long. Paper non-English to English dictionaries will be permitted, as will silent, non-programmable calculators with cleared memory. The examination period for trimester 1 is 10 June - 29 June.

## Plagiarism

Working Together and Plagiarism

We encourage you to discuss the principles of the course and assignments with other students, to help and seek help with programming details and problems involving the lab machines. However, any work you hand in must be your own work.

The School policy on Plagiarism (claiming other people's work as your own) is available from the course home page. Please read it. We will penalise anyone we find plagiarising, whether from students currently doing the course, or from other sources. Students who knowingly allow other students to copy their work may also be penalised. If you have had help from someone else (other than a tutor), it is always safe to state the help that you got. For example, if you had help from someone else in writing a component of your code, it is not plagiarism as long as you state (eg, as a comment in the code) who helped you in writing the method.

## Mandatory Requirements

To fulfil mandatory requirements for the course a student must

- Achieve at least a D in the examination.
- Submit the project report.

## Passing ECEN 303

To pass ECEN 303, a student must satisfy mandatory requirements and gain at least a **C-** grade overall.

## Withdrawal

The last date for withdrawal from ECEN 303 with entitlement to a refund of tuition fees is Friday 11 March 2016. The last date for withdrawal without being regarded as having failed the course is Friday 13 May 2016 -- though later withdrawals may be approved by the Dean in special circumstances.

## Rules & Policies

Find key dates, explanations of grades and other useful information at <http://www.victoria.ac.nz/home/study>.

Find out about academic progress and restricted enrolment at <http://www.victoria.ac.nz/home/study/academic-progress>.

The University's statutes and policies are available at <http://www.victoria.ac.nz/home/about/policy>, except qualification statutes, which are available via the Calendar webpage at <http://www.victoria.ac.nz/home/study/calendar> (See Section C).

Further information about the University's academic processes can be found on the website of the Assistant Vice-Chancellor (Academic) at <http://www.victoria.ac.nz/home/about/avcacademic>

All students are expected to be familiar with the following regulations and policies, which are available from the school web site:

[Grievances](#)

[Student and Staff Conduct](#)

[Meeting the Needs of Students with Disabilities](#)

[Student Support](#)

[Academic Integrity and Plagiarism](#)

[Dates and Deadlines including Withdrawal dates](#)

[School Laboratory Hours and Rules](#)

[Printing Allocations](#)

[Expectations of Students in ECS courses](#)

The School of Engineering and Computer Science strives to anticipate all problems associated with its courses, laboratories and equipment. We hope you will find that your courses meet your expectations of a quality learning experience.

If you think we have overlooked something or would like to make a suggestion feel free to talk to your course organiser or lecturer.

