

# Advanced Electronics - Course Outline

## ECEN 403: 2011 Trimester 2

This document sets out the workload and assessment requirements for ECEN 403. 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

By the end of the course, students should be able to:

1. Understand two port network Y,Z,S and H parameters 3(c)
2. Understand the small signal modeling methods of devices and circuits 3(c)
3. Understand device parasitic capacitances and how to include it within models 3(c)
4. Be able to perform SPICE simulations of various circuits 3(c),3(f)
5. Understand the various feedback topologies and the effects on input/output impedances 3(b)
6. Understand the principles of various RF circuits 3(a)
7. Understand the principles of RF amplifiers and interstage impedance matching 3(f)
8. Understand the limitations of lumped element models and be capable of applying vector calculus to Maxwell's equations in order to derive wave equations and transmission line equations 3(a).
9. Understand the Smith chart and be able to use it in order to design solutions to simple design problems 3(f).
10. Be able to design filters using microstrip 3(f)
11. Understand the principles of Phase locked Loops and be able to design PLL circuits 3(b)

### Textbook

There is no textbook for ECEN403. The following books are useful for this course:

- Sedra and Smith, Microelectronic circuits, sixth edition, Oxford University Press, 2010 (good for small signal BJT/MOS models)
- C. Coleman, An introduction to radio frequency engineering, Cambridge University Press, 2004 TK6560 C692 (covers most of the RF topics in the course.)
- Horowitz and Hill, The Art of Electronics, (2nd edition), Cambridge University Press, 1989 (good for practical techniques).

### Passive Filters

- H.H. Skilling, *Electrical Engineering Circuits*
- F.F. Kuo, *Network Analysis and Synthesis*
- M.E. Van Valkenburg, *Introduction to Modern network Synthesis*, TK3226/V284/I

### RF Design

- Christopher Bowick *RF Circuit Design*
- Ulrich L. Rohde, Jerry C. Whitaker, Andrew Bateman *Communications receivers* This is an excellent reference on designing receivers and covers cascaded noise figure and intermodulation, DSP issues and implementations and has a good section on VCOs and PLLs.
- Steve C. Cripps *RF Power Amplifiers for Wireless Communications* Is an excellent review of all the different types of power amplifiers and looks into the latest high efficiency architectures. It is the perfect starting point for anyone wanting to do research into power amplifier design.

## Lectures, Tutorials, Laboratories, and Practical work

A schedule of lecture topics, readings, and assignment due dates is available online

Lectures for ECEN 403 are: Monday, Tuesday, Thursday at 16:10 in CO250, commencing Monday 12 July.

Lab. Sessions for ECEN 403 are: Mondays 10am-1pm in CO250 commencing on Monday 19 July.

## Assignments and Projects

*Description of assignment/project work, including submission, and how the assigned work relates to the course objectives*

## Workload In order to maintain satisfactory progress in

ECEN 403, you should plan to spend an average of at least 15 hours per week on this paper.

## School of Engineering and Computer Science

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

## Staff

The coordinator for this course, and the lecturer for the first half is Dr Robin Dykstra:

Room:	AM226
Email:	<a href="mailto:Robin.Dykstra@ecs.vuw.ac.nz">Robin.Dykstra@ecs.vuw.ac.nz</a>
Phone:	463 5936

The lecturer for the second half of the course is A/Prof Paul Teal:

Room:	CO242
Email:	<a href="mailto:Paul.Teal@ecs.vuw.ac.nz">Paul.Teal@ecs.vuw.ac.nz</a>
Phone:	463 5966
Calendar & Website	<a href="http://ecs.victoria.ac.nz/Main/PaulTeal">http://ecs.victoria.ac.nz/Main/PaulTeal</a>

## Announcements and Communication

The main means of communication outside of lecture will be the web area at [http://ecs.victoria.ac.nz/Courses/ECEN403\\_2011T2/](http://ecs.victoria.ac.nz/Courses/ECEN403_2011T2/). There you will find, among other things, this document, the lecture schedule and assignment handouts.

## Assessment

Your grade for ECEN 403 will be determined based on the following assessment weightings:

<u>Item</u>	<u>Weight</u>
4 Assignments	20%
Labs	<= 20%
Final Examination	<= 80%

Laboratory exercises are optional, but will be assessed, and each one completed will reduce the exam component of the final grade, up to 20%.

Completion of the course requires handing in of 90% of assignments by the due dates, and attending 80% of the lectures.

Calculators may be used in the final examination.

The University has a policy on reasonable accommodation with respect to assessment procedures for students with disabilities.

## Tests and Exams

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. No computers, electronic calculators or similar device will be allowed in the final examination. Paper non-English to English dictionaries will be permitted. The study and examination period for trimester T2 is 21 Oct - 12 Nov.

## Practical Work

*Description of assignments / projects / etc, including rough dates and submission processes*

*Policies and penalties for late submission*

## 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, 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.

## Passing ECEN 403

To pass ECEN 403, a student must satisfy mandatory requirements and gain at least a **C** grade overall.

## Withdrawal

The last date for withdrawal from ECEN 403 with entitlement to a refund of tuition fees is Fri 22 July 2011. The last date for withdrawal without being regarded as having failed the course is Fri 23 Sept 2011 -- 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.