Advanced Electronics - Course Outline
ECEN 403: 2012 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 (and associated graduate attributes)

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

1. Understand the small signal modeling methods of devices and circuits including device parasitic capacitances 3(c)
2. Understand the two port network Y,Z,S and H parameters, and various feedback topologies and the effects on input/output impedances 3(a)
3. Understand the principles of RF circuits and amplifiers, and be able to design filters using microstrip 3(a) , 3(b)
4. Understand the Smith chart and be able to use it in order to design solutions to simple design problems, including RF amplifier inter-stage matching 3(a) , 3(b)

Textbook

Sedra and Smith, Microelectronic circuits, sixth edition, Oxford University Press, 2010 (good for small signal BJT/MOS models)

The following books are useful for this course:
General

- C. Coleman, An introduction to radio frequency engineering, Cambridge University Press, 2004 (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

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 high efficiency architectures. It is the perfect starting point for anyone wanting to do research into power amplifier design.

Course Content

The following is an outline of the topics covered in the lectures:

- Small Signal Modelling (SSM)
- SSM of MOSFETS
- SSM of Diodes
- SSM of BJTs
- Two port networks
- Capacitance and high frequency effects
- Feedback advantages
- Feedback impedance analysis

- RF Components
- Resonant Circuits
- Filters and Matching
- Vector Calculus
- Waves
- Transmission Lines
- Practical Transmission Lines and Waveguides
- The Smith Chart
- Impedance Matching
- Scattering Parameters
- RF Amplification
- RF Transformers and Stub Filters
- Antennas

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 and Friday at 1:10 pm in AMLT106

Labs for ECEN 403 are: Friday 3:00pm-5:00 pm in CO250.

Assignments

There are 10 written assignments, each due on Monday, except the last which is due on the last Friday.

Workload

In order to maintain satisfactory progress in ECEN 403, you should plan to spend an average of at least 10 per week on this paper. A plausible and approximate breakdown for these hours would be:
- Lectures and tutorials: 3 hours/week
- Laboratories: 2 hours/week
- Readings: 1 hours/week
- Assignments: 4 hours/week

School of Engineering and Computer Science

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

Staff

The course organiser for ECEN 403 is Paul Teal. The lecturers for the course are Paul Teal and Ramesh Rayudu. Their contact details are:
- Paul Teal
- McDiarmid 228
- +64 4 463 5966
- paul.teal@vuw etc

- Ramesh Rayudu
- Cotton 352
- +64 4 463 5233
- ramesh.rayudu@ecs.vuw etc

Announcements and Communication

The main means of communication outside of lectures will be the ECEN 403 web area at http://ecs.victoria.ac.nz/Courses/ECEN403_2012T2/. There you will find, among other things, this document, and the lecture schedule.

Assessment

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

Item	Weight
10 written assignments	30%

4 laboratory sessions	10%
Final Examination (3 hours)	60%

Bachelor of Engineering students should be aware that copies of their assessed work may be retained for inspection by an IPENZ appointed accreditation panel.

Policies and penalties for late submission

The printed results of each laboratory session is to be handed in no later than one week following the laboratory session. Assignments and labs not collected in lectures can be collected from the SECS school office. Late submission of lab work incurs a penalty of 10% per working day.

The best 8 marks for the 10 written assignments will be counted to the 30% for the assignments. Because of the rapid turnaround of these small assignments, late submissions will not be accepted.

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 examination period for trimester 2 is 26 Oct - 17 Nov.

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.

Mandatory Requirements

1. Attendance at 85% of lectures
2. Submission of a reasonabe attempt of 80% of assignments
3. Submission of a reasonabe attempt of 80% of laboratories

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 Friday 27 July 2012. The last date for withdrawal without being regarded as having failed the course is Friday 28 Sept 2012 -- 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

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.

Course Outline as PDF