

# Advanced Control Systems Engineering - Course Outline

## ECEN 415: 2010 Trimester 2

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This document sets out the workload and assessment requirements for ECEN 415. 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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By the end of the course, students should be able to

1. Produce state-space models of a variety of electronic and mechanical systems (BE graduate attributes [3\(a\)](#),[3\(c\)](#)),
2. Design continuous and discrete time compensators using state-space techniques (BE graduate attributes [3\(a\)](#),[3\(b\)](#)),
3. Design Luenberger state observers and Kalman filters, (BE graduate attributes [3\(a\)](#),[3\(b\)](#),[3\(e\)](#)),
4. Design control systems using Optimal Control techniques, including LQG (BE graduate attributes [3\(a\)](#),[3\(b\)](#)),
5. Design control systems using model-based predictive control (BE graduate attributes [3\(a\)](#),[3\(b\)](#),[3\(e\)](#)),
6. Use the Matlab and Simulink environments to solve theoretical and practical problems in control engineering (BE graduate attributes [3\(d\)](#),[3\(f\)](#)).

### Textbook

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The textbook for the course is Astrom and Murray "Feedback Systems: An Introduction for Scientists and Engineers". The text has a web site at [http://www.cds.caltech.edu/~murray/amwiki/index.php/Main\\_Page](http://www.cds.caltech.edu/~murray/amwiki/index.php/Main_Page) which includes pdf versions of the book.

### Lectures, Tutorials, Laboratories, and Practical work

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

Lectures for ECEN 415 are held on Tuesday at 2pm and Thursday at 10am in CO250. Additional tutorial sessions will be held in CO250 as required. Practical work for ECEN 415 can be undertaken at any time in AM218.

### Assignments and Practical Work

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The four assignments for the course will require a combination of written work and computational exercises. They will be due at the end of weeks four, six, nine and eleven. Practical work will consist of a series of experiments that may be completed when convenient. Two practical reports must be handed in at the end of weeks five and ten.

### Workload

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In order to maintain satisfactory progress in ECEN 415, you should plan to spend an average of at least ten hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures and tutorials: 3 hours
- Reading and Extra Problems: 3 hours
- Assignments and Laboratories: 4 hours

### 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 415 is located on the second floor of the Cotton Building.

### Staff

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The course organiser for ECEN 415 is [Christopher Hollitt](#). The other lecturer for the course is [Paul Austin](#). Their contact details are:

- [Christopher Hollitt](#)
- [Alan MacDiarmid 223](#)
- +64 4 463 6730
- [Christopher.Hollitt@vuw.ac.nz](mailto:Christopher.Hollitt@vuw.ac.nz)

- *Paul Austin*
- Cotton 352
- +64 4 463 9998
- Paul.Austin@vuw.ac.nz

## Announcements and Communication

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The main means of communication outside of lectures will be the ECEN 415 web area at [http://ecs.victoria.ac.nz/Courses/ECEN415\\_2010T2/](http://ecs.victoria.ac.nz/Courses/ECEN415_2010T2/). There you will find, among other things, this document, the lecture schedule and assignment handouts, and the ECEN 415 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 415 will be determined based on the following assessment weightings:

<u>Item</u>	<u>Weight</u>
Assignments (4)	20%
Laboratories	20%
Mid-trimester Test	10%
Final Examination	50%

The four assignments will have equal weighting in determining the overall assignment mark.

Work submitted late will be subject to a penalty of 10% of the total mark per day (or part thereof). No work will be accepted once the solutions have been posted and we may choose to post the solutions immediately after the due date.

The assignments and laboratories will assess the students' mastery of all course objectives. The test and examination will assess the students' mastery of course objectives one through five.

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

## Tests and Exams

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The mid-trimester test will cover all aspects of the lecture material covered during the first half of the trimester. The final exam will cover the entire course, with 20% of the overall course mark examining material from the first half of the trimester, and the remaining 30% covering material from the second half.

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. Non-programmable, non-graphical calculators without a full alphanumeric keyboard will be permitted in the examination. Paper non-English to English dictionaries will also be permitted. The examination period for trimester 2 is 18 October - 14 November.

## Plagiarism

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### 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

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It is expected that *all* work will be completed and submitted for assessment. An incomplete or fail grade will be issued to any student who satisfies *any* of the conditions below:

1. Does not submit a reasonable attempt for all four assignments.
2. Does not submit a reasonable attempt for the required laboratory reports.
3. Does not achieve at least a **D** grade for the final exam.

## Passing ECEN 415

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To pass ECEN 415, a student must satisfy mandatory requirements and gain at least a **C** grade overall.

## Withdrawal

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The last date for withdrawal from ECEN 415 with entitlement to a refund of tuition fees is Fri 23 July 2010. The last date for withdrawal without being regarded as having failed the course is Fri 24 Sept 2010 -- though later withdrawals may be approved by the Dean in special circumstances.

## Rules & Policies

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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.

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