

# Digital Electronics - Course Outline

## ECEN 202: 2012 Trimester 1

The course provides a practical introduction to the design and construction of **basic digital electronic circuits**. It studies **combinatorial and sequential logic** and the **application** of such devices in **practical logic circuits**. A strong focus is placed on the **design of sequential logic circuits using the state machine technique**. It will also look at special function logic circuits and **memory devices**. Emphasis is placed in the laboratory on construction techniques and **fault finding**. The effective presentation of laboratory results in written reports and forms is an integral part of the course.

### Objectives

On successfully completing this course, students should be able to:

1. Describe the properties, construction and operating characteristics of digital integrated circuits from the most important CMOS and TTL logic families. (BE graduate attribute 3(a))
2. Describe the basic logic operations using Boolean algebra, truth tables and logic circuits and be able to simplify complex logic circuits via Boolean algebra and the K map method. (BE graduate attribute 3(a))
3. Understand the use of various types of flip-flops in creating sequential circuits and their uses in synchronization, frequency division and counting. (BE graduate attribute 3(a, b))
4. Design synchronous sequential circuits using the state machine method. (BE graduate attribute 3(b, c))
5. Understand the design and application of a selection special function ICs, including memory devices. (BE graduate attribute 3(a, b))
6. Effectively communicate technical results by producing competent written reports and oral presentations. (BE graduate attribute 2(b))

### Prerequisites

The prerequisites for ECEN 202 are:

- ENGR101
- MATH 151 or MATH 114.

### Course Materials and Texts

A study guide containing the core class notes and laboratory instructions will be available on the course blackboard site. In addition students may be required to take down additional notes in class. No textbook is required, but the book *Digital Systems, by R J Tucci* may be used as additional reading. The library should have some copies on closed reserve and on 3-day loan. Any edition from the 7th or later is suitable.

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

**Lectures:** Tuesdays, Thursdays and Fridays from 10.00 – 10.50 am in AM106

**Labs:** One 4-hour lab per week on Wednesdays from 9.00 am – 1.00 pm or 1.00 – 5.00 pm. Labs will be held in LB217. Allocation of the lab sessions will take place in the first lecture.

### Assignments and Projects

The assessment for ECEN 202 involves assignments, two in-term tests, weekly laboratories, and design exercises as detailed below:

Assessed Item	Length / Duration	Due Date	Objectives Assessed
Laboratory Work + Report	Weekly report	Weeks 2 -12	1-6
Assignments	TBD	Weeks 2-12	1-5
Design Experiment + Report	TBD	Weeks 9 - 12	4
Test 1	1 Hour	Week 6	1-3
Test 2	1 Hour	Week 12	3-5

All work is due in on the due date. Marks will be deducted at a rate of 10% of the full mark for each working day late. Work will not be marked if more than 1 week late. Extensions must be requested in writing (email) and will only be given in exceptional circumstances, and if agreed before the due date.

In the event of an aegrotat application, regular submission and performance in assignments and laboratories will contribute substantially to the outcome.

## Workload

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On average, students should plan to spend a minimum of 10 hours per point i.e., 150 hours for a 15 point course, or 10-12 hours per week, including exam periods, in order to achieve an average grade for this course.

## School of Engineering and Computer Science

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

## Staff

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The course organiser for ECEN 202 is Pawel Dmochowski. The lecturers for the course are Pawel Dmochowski and Gideon Gouws. Their contact details are:

- *Pawel Dmochowski*
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## Announcements and Communication

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This course uses Blackboard. Course materials and other information will be posted on Blackboard. Students should check Blackboard regularly.

Registered students will find information on Blackboard at: <http://blackboard.vuw.ac.nz>

## Assessment

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Your grade for ECEN 202 will be determined based on the following assessment weightings:

Assessed Item	Weight
Laboratory Work + Report	20%
Assignments	10%
Design Experiment + Report	20%
Test 1	25%
Test 2	25%

## Laboratory Work

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The course has 7 one-session experiments and 1 two-session design exercise associated with it. All experimental work must be started in the scheduled periods. If you do not complete the work in this session, arrangements can be made to complete at a later stage (before the next session). However, no laboratory demonstrators will be available out of sessions.

**It is required that you keep detailed experimental notes for all experiments in a logbook. In addition, data acquired / graphs plotted should be electronically stored and kept to the end of the course.** A 2B5 hardcover is ideal for this and a single logbook can be kept for ECEN201 and 202.

At the end of each laboratory you will be required to submit a short laboratory report. This report will be based on a number of questions asked at the end of each laboratory script. This report must be handed in no later than one week after the experiment had been scheduled.

Your final mark for each laboratory will consist of a mark for your report as well as a mark assigned by the lecturer / lab demonstrator for your contribution in the laboratory.

## Assignments

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Assignments will be set approximately once every two weeks and should be handed in before the required deadline.

## Design Exercise and Report

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Full details of the design and reporting requirements will be handed out during the course. Please note the deadline for design demonstration, which is one week after your last design laboratory session, as well as the deadline for the design report.

## Handing in of Work

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Drop boxes on the second floor of the Laby building, opposite to the laboratory, will be marked for your laboratory reports or assignments.

## 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, 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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Mandatory course requirements are as follows:

1. Satisfactory completion of the design exercise.
2. Satisfactory completion of at least 6 of the 7 laboratory experiments.
3. A minimum of 40% averaged over the two in-term tests.

## Passing ECEN 202

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To pass ECEN 202, 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 202 with entitlement to a refund of tuition fees is Friday 16 March 2012. The last date for withdrawal without being regarded as having failed the course is Friday 18 May 2012 -- 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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