



Prescription

An introduction to the design and construction of digital electronic instruments. Following a review of binary arithmetic and Boolean algebra, the course will focus on the design of digital circuits using both combinatorial and sequential logic. Further work will study microprocessor architectures, programming and interfacing and the conversions of digital and analogue signals.

Course learning objectives

Students who pass this course should be able to:

1. Describe the properties, construction and operating characteristics of digital integrated circuits from the most important CMOS Logic families. (BE graduate attribute 3(a))
2. Use the understanding of the basic logic operations and logic circuit elements to create digital circuits. (BE graduate attribute 3(a,b))
3. Design synchronous sequential circuits. (BE graduate attribute 3(b,c))
4. Explain the basic architecture of a microcontroller (BE graduate attribute 3(a))
5. Program a microprocessor in assembly language to implement an embedded system. ((BE graduate attribute 3(a, b))

Course content

In 2021, it will be possible to take this course remotely, and distance-based versions of the lectures, labs, and all other material will be available. However, the resources for the remote alternative to the labs are limited, and the remote option will only be available for students with a good justification (for example, enrolling from overseas). Students who can be in Wellington must participate in the face-to-face labs to develop the critical practical lab knowledge and skills for the course.

Students taking this course remotely must have access to a computer with camera and microphone and a reliable high speed internet connection that will support real-time video plus audio connections and screen sharing. Students must be able to use Zoom; other communication applications may also be used. A mobile phone connection only is not considered sufficient. The computer must be adequate to support the programming required by the course: almost any modern windows, macintosh, or unix laptop or desktop computer will be sufficient, but an Android or IOS tablet will not.

If the assessment of the course includes tests, the tests will generally be run in-person on the Kelburn campus. There will be a remote option for students who cannot attend in-person, but the remote option imposes extra costs on the School and will be limited to students with a strong justification (for example, being enrolled from overseas). The remote test option will use the ProctorU system for online supervision of the tests. ProctorU requires installation of monitoring software on your computer which also uses your camera and microphone, and monitors your test-taking in real-time. Students who will need to use the remote test option must contact the course coordinator in the first two weeks to get permission and make arrangements.

Withdrawal from Course

Withdrawal dates and process:

<https://www.wgtn.ac.nz/students/study/course-additions-withdrawals>

Lecturers

Robin Dykstra (Coordinator)

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415 Alan MacDiarmid Building, Kelburn

Gideon Gouws

Gideon.Gouws@vuw.ac.nz 04 4635952

225 Alan MacDiarmid Building, Kelburn

Teaching Format

The course will be taught through lectures and tutorials and with a strong focus on laboratory design skills.

Student feedback

Student feedback on University courses may be found at:

www.cad.vuw.ac.nz/feedback/feedback_display.php

Dates (trimester, teaching & break dates)

- Teaching: 22 February 2021 - 28 May 2021
- Break: 05 April 2021 - 18 April 2021
- Study period: 31 May 2021 - 03 June 2021
- Exam period: 04 June 2021 - 19 June 2021

Class Times and Room Numbers

22 February 2021 - 04 April 2021

- **Monday** 13:10 - 14:00 – 205, Te Toki a Rata, Kelburn
- **Wednesday** 13:10 - 14:00 – LT206, Easterfield, Kelburn
- **Friday** 13:10 - 14:00 – LT206, Easterfield, Kelburn

19 April 2021 - 30 May 2021

- **Monday** 13:10 - 14:00 – 205, Te Toki a Rata, Kelburn
- **Wednesday** 13:10 - 14:00 – LT206, Easterfield, Kelburn
- **Friday** 13:10 - 14:00 – LT206, Easterfield, Kelburn

Set Texts and Recommended Readings

Required

There are no required texts for this offering.

Mandatory Course Requirements

There are no mandatory course requirements for this course.

If you believe that exceptional circumstances may prevent you from meeting the mandatory course requirements, contact the Course Coordinator for advice as soon as possible.

Assessment

This course is 100% internally assessed.

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
Two design projects	TBC	CLO: 1,2,3	15%
Laboratory work (3 hrs per week)	TBC	CLO: 2,3,5	35%
Two Tests (90 minutes duration each)	TBC	CLO: 1,2,3,4,5	50%

Penalties

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

Extensions must be requested in writing (email) and will only be given in exceptional circumstances, and if agreed before the due date. No late work will be accepted after the model solutions to any piece of assessment have been distributed to the class.

Submission & Return

All submissions are to be electronic and via the ECS online submission system.

Workload

The student workload for this course is 150 hours.

Teaching Plan

The following material will be covered during EEEN 202:

Overview of logic gates, combinatorial logic, Boolean algebra, simplification, K-maps
Sequential logic, Flip-Flops, Counters, asynchronous and synchronous,
Registers, Arithmetic Circuits
Design of synchronous counters, state machines
Selected Special Function Digital ICs

Microprocessor architecture and operation based on 8051,
Timing, polling and interrupts
Analog to digital conversion,
Memory Devices

Communication of Additional Information

Course materials and other information will be available from https://ecs.wgtn.ac.nz/Courses/EEEN202_2021T1/. Students should check there regularly.

Links to General Course Information

- Academic Integrity and Plagiarism: <https://www.wgtn.ac.nz/students/study/exams/integrity-plagiarism>
- Academic Progress: <https://www.wgtn.ac.nz/students/study/progress/academic-progress> (including restrictions and non-engagement)
- Dates and deadlines: <https://www.wgtn.ac.nz/students/study/dates>
- Grades: <https://www.wgtn.ac.nz/students/study/progress/grades>
- Special passes: Refer to the Assessment Handbook, at <https://www.wgtn.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf>
- Statutes and policies, e.g. Student Conduct Statute: <https://www.wgtn.ac.nz/about/governance/strategy>
- Student support: <https://www.wgtn.ac.nz/students/support>
- Students with disabilities: https://www.wgtn.ac.nz/st_services/disability/
- Student Charter: <https://www.wgtn.ac.nz/learning-teaching/learning-partnerships/student-charter>
- Terms and Conditions: <https://www.wgtn.ac.nz/study/apply-enrol/terms-conditions/student-contract>
- Turnitin: <http://www.cad.vuw.ac.nz/wiki/index.php/Turnitin>
- University structure: <https://www.wgtn.ac.nz/about/governance/structure>
- VUWSA: <http://www.vuwsa.org.nz>

Offering CRN: [33054](#)

Points: 15

Prerequisites: one of (COMP 102, 112, ENGR 101, 121, MATH 161)

Restrictions: ECEN 202

Duration: 22 February 2021 - 20 June 2021

Starts: Trimester 1

Campus: Kelburn