



## Prescription

Further mathematical techniques employed by electrical and electronic engineers, with a focus on methods of calculus, differential equations, and linear algebra. There is an emphasis on engineering applications and use of software.

## Course learning objectives

Students who pass this course will be able to:

1. Interpret, manipulate and derive expressions and properties of differential and integral calculus, and linear algebra.
2. Apply concepts and techniques of calculus and linear algebra to analyse engineering systems and solve engineering problems.
3. Demonstrate mastery of a range of fundamental techniques for solving problems in calculus and linear algebra.
4. Demonstrate an ability to effectively use approximation and numerical techniques, especially in the estimation of physical parameters.
5. Creatively and collaboratively combine skills and knowledge from mathematics, physics, computing and engineering to model an engineering problem.

## Course content

The course is primarily offered in-person, and the tests will require in-person attendance for all students in the Wellington region. There will also be a remote option and there will be online alternatives for all the components of the course for students who cannot attend in-person.

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 and who have a strong justification (for example, being enrolled from overseas).

The remote test option will use Zoom for online supervision of the tests and you must be able to use Zoom with a camera, microphone, and screen-sharing. 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.

- Lectures
- Tutorials
- Staff office hours

- Laboratory classes
- Drop in help desk sessions

## Material to be covered:

Complex numbers; Introduction to linear algebra; Applications of differentiation; Integration of functions; Functions of several variables; Introduction to ordinary differential equations

# Withdrawal from Course

Withdrawal dates and process:

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

## Lecturers

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### Dr Steven Archer (Coordinator)

[steven.archer@vuw.ac.nz](mailto:steven.archer@vuw.ac.nz) 04 886 4493

CO 363 Cotton Building (All Blocks), Gate 7, Kelburn Parade, Kelburn

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### Dr Dillon Mayhew

[dillon.mayhew@vuw.ac.nz](mailto:dillon.mayhew@vuw.ac.nz) 04 463 5155

CO 435 Cotton Building (All Blocks), Gate 7, Kelburn Parade, Kelburn

Howard Lukefahr is in charge of the laboratory projects and reports.

## Teaching Format

During the trimester, there will be four lectures per week most weeks, with a total of 30 lectures. Lectures are recorded to video and available to students for review. Students may attend in person, or live online using Zoom.

Labs are approximately fortnightly with specific times and dates posted on BlackBoard.

Students attend one two-hour lab most weeks, and students are also encouraged to attend one tutorial session each week. Labs and tutorials start in Week 2. Sign-ups for labs and tuts will be in the first week of lectures using myAllocator.

Lectures will not necessarily cover all of the examinable material. Note that examinable material includes all lecture notes, assignments and tutorials, and everything discussed during lecture times.

## Student feedback

Student feedback on University courses may be found at:

[www.cad.vuw.ac.nz/feedback/feedback\\_display.php](http://www.cad.vuw.ac.nz/feedback/feedback_display.php)

## Dates (trimester, teaching & break dates)

- Teaching: 11 July 2022 - 14 October 2022
- Break: 22 August 2022 - 04 September 2022
- Study period: 17 October 2022 - 20 October 2022

- Exam period: 21 October 2022 - 12 November 2022

## Class Times and Room Numbers

### 11 July 2022 - 21 August 2022

- **Monday** 15:10 - 16:00 – LT220, Murphy, Kelburn
- **Tuesday** 15:10 - 16:00 – LT220, Murphy, Kelburn
- **Wednesday** 15:10 - 16:00 – LT220, Murphy, Kelburn
- **Friday** 15:10 - 16:00 – LT220, Murphy, Kelburn

### 05 September 2022 - 16 October 2022

- **Monday** 15:10 - 16:00 – LT220, Murphy, Kelburn
- **Tuesday** 15:10 - 16:00 – LT220, Murphy, Kelburn
- **Wednesday** 15:10 - 16:00 – LT220, Murphy, Kelburn
- **Friday** 15:10 - 16:00 – LT220, Murphy, Kelburn

## Other Classes

Students are encouraged to attend at least one tutorial each week, on campus or online. Labs are approximately fortnightly and are best attended on campus. Online labs are possible only by special arrangement. Signup for Tutorials and Labs is in the first week of Trimester, and specific times and dates will be posted on BlackBoard.

Tutorials are offered each week from the second week of Trimester, and are a good preparation for the assignments. Attendance is highly recommended for one or more hours a week. Students are welcome to attend more than one tutorial each week.

## Set Texts and Recommended Readings

### Required

The lecture notes provided will be detailed, and available online in advance of lectures. Lectures are intended to help understand the notes, rather than to cover every detail of the notes.

### Recommended

The recommended text is useful for this course, especially if a student needs extra examples and details.

- Engineering Mathematics: A foundation for electronic, electrical, communications and systems engineers. A. Croft, R. Davison, M. Hargreaves & J. Flint. Pearson, UK. Any edition is OK

## 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 will be assessed through a combination of weekly assignments, tutorial participation, lab reports, and two tests.

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
8 assignments	See website	CLO: 1,2,3,4	20%
8 participation checks	See website	CLO: 1,2,3,4	5%
Two tests	See website	CLO: 1,2,3,4	50%
5 lab reports	See website	CLO: 1,2,3,4,5	25%

## Penalties

Late assignments will not be marked. Late lab reports may lose marks.

## Extensions

Extensions can be granted in exceptional cases. All extension requests should be submitted through ECS extension system.

## Submission & Return

**Assignment answers and lab reports** will be submitted by students online through the course website. It is important for students to immediately check the file they have uploaded, by downloading it again, to ensure it is the correct file. Feedback on marked assignments and reports will be provided to students online.

## Workload

In order to maintain satisfactory progress in ENGR 122, you should plan to spend an average of at least twelve hours per week or a total of 150 hours on this course.

## Teaching Plan

A teaching plan with a detailed Reading Plan and assignment, Lab and Test timings, will be posted to the course home pages on Blackboard.

## Communication of Additional Information

Announcements, lecture notes, videos of lectures, lab information, sample Tests, tutorials and assignments will be posted on the website (Blackboard).

## 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/](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: [26053](#)**

**Points:** 15

**Prerequisites:** ENGR 121 or MATH 141;

**Restrictions:** the pair (MATH 142, 151)

**Duration:** 11 July 2022 - 13 November 2022

**Starts:** Trimester 2

**Campus:** Kelburn