



## Prescription

The course will look at different techniques that can be used to automatically discover bugs and vulnerabilities in software. The course covers both static and dynamic techniques and discusses the pros and cons of various approaches. Students will develop their own program analyses, and learn how to use existing state-of-the-art tools.

## Course learning objectives

Students who pass this course will be able to:

1. Explain the basic principles of static and dynamic program analysis.
2. Assess the properties of different program analyses with respect to recall, soundness, precision, provenance and scalability.
3. Use the standard program representations and computational models for static program analysis.
4. Use state-of-the-art static program analysis tools for bug and vulnerability detection, and interpret the analysis results.
5. Understand and use code instrumentation.
6. Use advanced testing techniques including automated input and test generation.
7. Explain the causes of test flakiness and strategies how to mitigate them.

## Course content

### Dual Delivery

The course is primarily offered in-person, but 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.

# Withdrawal from Course

Withdrawal dates and process:

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

## Lecturers

### Dr Jens Dietrich (Coordinator)

[jens.dietrich@vuw.ac.nz](mailto:jens.dietrich@vuw.ac.nz) 04 463 9514

CO 261 Cotton Building (All Blocks), Gate 7, Kelburn Parade, Kelburn

## Teaching Format

This course will be offered in-person and online. For students in Wellington, there will be a combination of in-person components and web/internet based resources. It will also be possible to take the course entirely online for those who cannot attend on campus, with all the components provided in-person also made available online.

During the trimester there will be two lectures and four hours of help desk per week.

## 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)

But note that this version of the course has not been offered before.

## 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** 13:10 - 14:00 – 102, Alan MacDiarmid Building, Kelburn
- **Thursday** 13:10 - 14:00 – 102, Alan MacDiarmid Building, Kelburn

### 05 September 2022 - 16 October 2022

- **Monday** 13:10 - 14:00 – 102, Alan MacDiarmid Building, Kelburn
- **Thursday** 13:10 - 14:00 – 102, Alan MacDiarmid Building, 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

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
Assignment 1		CLO: 1,2,3	20%
Assignment 2		CLO: 1,2,3,4,5	20%
Assignment 3		CLO: 1,2,3,4,5,6,7	20%
Test		CLO: 1,2,3,4,5,6,7	40%

## Penalties

Late submissions will be subject to a reduction in the maximum mark possible of 10% per day for up to 5 days. No work will be accepted after this unless previously arranged with the Course Coordinator.

## Extensions

Students have four slip days across the course that will be granted automatically.

Work submitted after slip days without an extension may be marked pass/fail.

Individual personal extensions will only be granted in exceptional personal circumstances, and should be negotiated with the course coordinator before the deadline whenever possible. Documentation (e.g., medical certificate) may be required.

## Submission & Return

All work should be submitted through the ECS submission system, accessible through the course web pages. Marks and comments will be returned through the ECS marking system, also available through the course web pages.

## Workload

In order to maintain satisfactory progress, you should plan to spend an average of 10 hours per week on this paper, and 150 hours over the entire course. A plausible and approximate breakdown for these hours would be:

- Lectures and help desks: 4 hours,
- Readings: 2-3 hours, and
- Assignments and project: 3-4 hours.

## Teaching Plan

See [https://ecs.wgtn.ac.nz/Courses/SWEN438\\_2022T2/LectureSchedule](https://ecs.wgtn.ac.nz/Courses/SWEN438_2022T2/LectureSchedule)

## Communication of Additional Information

All online material for this course can be accessed at [https://ecs.wgtn.ac.nz/Courses/SWEN438\\_2022T2/](https://ecs.wgtn.ac.nz/Courses/SWEN438_2022T2/)

## 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:** [18597](#)

**Points:** 15

**Prerequisites:** COMP 261, 30 300-level points from COMP, CYBR, NWEN, SWEN

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

**Starts:** Trimester 2

**Campus:** Kelburn