



## Prescription

The course provides a broad introduction to computer networks and a basic understanding of network application programming, with an emphasis on the working principles and application of computer networks. It covers a range of introductory topics including the essentials of data communication, computer network concepts, protocols, network applications and cloud computing. The course features an interactive laboratory component with projects starting from basic networking technologies leading into cloud application development.

## Course learning objectives

Students who pass this course will be able to:

1. Explain the basics of networks and the design of their associated protocols (GA 3(a), 3(b), 3(d), 3(e), 3(f))
2. Explain how networks are utilised for various roles (GA 3(a), 3(b), 3(d), 3(e), 3(f)).
3. Explain the role of the application layer, the socket API and the basics of building networked, cloud, or distributed applications and the design of their associated protocols (GA 3(a), 3(b), 3(d), 3(e), 3(f)).
4. Implement applications that make use of the Socket API and Cloud computing, including at least two cloud service level paradigms.

## Course content

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.

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This course introduces protocols and algorithms for networked and distributed systems. Specific emphasis will be placed on the basic elements of networking , application layer protocols, and distributed computation in the cloud .

Topics will include:

1. Introduction & Datalink Layer

2. Routing & Routing/IP
3. BGP/Transport
4. TCP
5. DNS
6. HTTP/XML/Application Layer

Break:

7. Introduction to the Cloud, Cloud Infrastructure VMs
8. Service Models
9. Containers and Micro Services
10. Container Architecture and Orchestration
11. PaaS - MapReduce, Workflows and Processing Big Data
12. Datacenters, reliability and Green computing

## Withdrawal from Course

Withdrawal dates and process:

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

## Lecturers

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### Kris Bubendorfer (Coordinator)

[kris.bubendorfer@vuw.ac.nz](mailto:kris.bubendorfer@vuw.ac.nz) 04 4636484

403 Cotton Bldg Gate 7 Kelburn Parade, Kelburn

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### Winston Seah

[winston.seah@vuw.ac.nz](mailto:winston.seah@vuw.ac.nz) 04 4635233 ext 8493

416 Alan MacDiarmid Building, Kelburn

## Teaching Format

This course will be offered in-person and online. For students in Wellington, in person lectures and labs will be given as per the usual schedule. There will be 2 lectures per week on Tuesday and Thursday. The lectures will also be recorded for those students who will be taking the course remotely and there will be zoom sessions with the lab tutors.

## 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: 05 July 2021 - 08 October 2021
- Break: 16 August 2021 - 29 August 2021
- Study period: 11 October 2021 - 14 October 2021

- Exam period: 15 October 2021 - 06 November 2021

## Class Times and Room Numbers

### 05 July 2021 - 15 August 2021

- **Tuesday** 14:10 - 15:00 – MT228, Student Union, Kelburn
- **Thursday** 14:10 - 15:00 – MT228, Student Union, Kelburn

### 30 August 2021 - 10 October 2021

- **Tuesday** 14:10 - 15:00 – MT228, Student Union, Kelburn
- **Thursday** 14:10 - 15:00 – MT228, Student Union, Kelburn

## Other Classes

You will need to sign up for a weekly 2 hour lab session, starting in week 2.

## Set Texts and Recommended Readings

### Required

There are no required texts for this offering.

### Recommended

- Andrew Tanenbaum, *Computer Networks*, 5th edition.
- James Kurose and Keith Ross, *Computer Networks: A top down approach featuring the Internet*, Fifth Edition.
- William Stallings, *Data and Computer Communications*, ninth edition.

## Mandatory Course Requirements

In addition to achieving an overall pass mark of at least 50%, students must:

- achieve at least an average of a **D** grade in the test to demonstrate achievement of all the CLOs of the 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 the following:

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
Three projects, 15% ea.	Weeks 5, 9, 12	CLO: 1,2,3,4	45%
Four Assignments, 2.5% each.	Weeks 3,6,8,11	CLO: 1,2,3,4	10%
Test, 2 hrs 45%	Assessment Period.	CLO: 1,2,3	45%

## Penalties

Late Labs and Assignments will be penalised at a rate of 10% per calendar day late, up to a maximum of 5 days late, at which time the work will not be accepted for marking.

## Extensions

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

## Submission & Return

All work is 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 in NWEN 243, you should plan to spend an average of 10 hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures : 2
- Laboratory: 2
- Practical work: 5
- Assignments 1

## Teaching Plan

See [https://ecs.wgtn.ac.nz/Courses/NWEN243\\_2021T2/LectureSchedule](https://ecs.wgtn.ac.nz/Courses/NWEN243_2021T2/LectureSchedule)

## Communication of Additional Information

All online material for this course can be accessed at [https://ecs.wgtn.ac.nz/Courses/NWEN243\\_2021T2/](https://ecs.wgtn.ac.nz/Courses/NWEN243_2021T2/)

## 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:** [19863](#)

**Points:** 15

**Prerequisites:** COMP 103.

**Duration:** 05 July 2021 - 07 November 2021

**Starts:** Trimester 2

**Campus:** Kelburn