



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

2022: The course is primarily offered in-person, and there are components such as tests, labs, tutorials, and marking sessions which require in-person attendance. There will be remote alternatives for all the components of the course, but these are only available to students studying from outside the Wellington region. The remote option for tests will use a Zoom-based system for online supervision of the tests.

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.

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 to the Cloud, Cloud Infrastructure VMs
2. Service Models
3. Containers and Micro Services
4. Container Architecture and Orchestration
5. PaaS - MapReduce, Workflows and Processing Big Data

6. Datacenters, reliability and Green computing
- Break
7. Introduction & Datalink Layer
8. Routing & Routing/IP
9. BGP/Transport
10. TCP
11. DNS
12. HTTP/XML/Application Layer

Withdrawal from Course

Withdrawal dates and process:

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

Lecturers

Dr Kris Bubendorfer (Coordinator)

kris.bubendorfer@vuw.ac.nz 04 463 6484

AM 403 Alan Macdiamid Building, Gate 7, Kelburn Parade, Kelburn

Prof Winston Seah

winston.seah@vuw.ac.nz 04 887 3875

AM 416 Alan Macdiamid Building, Gate 7, Kelburn Parade, Kelburn

Teaching Format

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

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

- **Tuesday** 11:00 - 11:50 – LT101, Maclaurin, Kelburn

- **Thursday** 11:00 - 11:50 – LT101, Maclaurin, Kelburn

05 September 2022 - 16 October 2022

- **Tuesday** 11:00 - 11:50 – LT101, Maclaurin, Kelburn
- **Thursday** 11:00 - 11:50 – LT101, Maclaurin, Kelburn

Other Classes

You will need to sign up for a lab session.

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 Exam 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, 20% ea.	Weeks 5, 7, 11	CLO: 1,2,3,4	60%
Two Assignments, 5% each.	Weeks 6 and 10	CLO: 1,2,3,4	10%
Exam, 2 hrs	Assessment Period.	CLO: 1,2,3	30%

Penalties

Late Labs (you have 3 days penalty free lateness shared over all labs) and Assignments (no free lateness) 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 should be negotiated with the course coordinator before the deadline whenever possible. Documentation (eg, medical certificate) may be required. You will need to apply for extensions using the extension tool in the ECS submission system - linked off each individual assessment item.

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_2022T2/LectureSchedule

Communication of Additional Information

All online material for this course can be accessed at https://ecs.wgtn.ac.nz/Courses/NWEN243_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/
- 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: 11 July 2022 - 13 November 2022

Starts: Trimester 2

Campus: Kelburn