



Prescription

This course considers the issues raised when programming at a low-level, for example in embedded systems, OS system level, or network protocol stacks. It includes an introduction to C language programming and motivating examples related to a wide variety of applications of system programming.

Course learning objectives

Students who pass this course should be able to:

1. Use appropriate tools compiling/debugging C/C++ programs.
2. Write C programs using pointers and arrays, user-defined data types, input/output operations, bit-level operations, and user-defined and library routines.
3. Understand the differences between C and C++, and write C++ programs using stream input/output, classes, vectors and templates.
4. Use or understand the main techniques of dynamic memory management in C and C++.
5. Structure larger programs in multiple files.
6. Understand the differences between application software and system software.

Course content

2022: The course is primarily offered in-person, and there are components such as tests, and lab exercises 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.

Withdrawal from Course

Withdrawal dates and process:

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

Lecturers

Dr Jyoti Sahni (Coordinator)

Dr Alvin Valera

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. Refer to https://ecs.wgtn.ac.nz/Courses/NWEN241_2022T1/CovidPlan for more details.

During the trimester there will be three lectures per week where the third lecture is a tutorial-style lecture. There are practical lab (programming) assignments that require students to apply the concepts taught during the lectures.

Student feedback

A summary of the course feedback provided by students previously for this course is available at http://www.cad.vuw.ac.nz/feedback/feedback_display.php.

Dates (trimester, teaching & break dates)

- Teaching: 28 February 2022 - 03 June 2022
- Break: 11 April 2022 - 24 April 2022
- Study period: 06 June 2022 - 09 June 2022
- Exam period: 10 June 2022 - 25 June 2022

Class Times and Room Numbers

28 February 2022 - 10 April 2022

- **Monday** 15:10 - 16:00 – LT205, Hugh Mackenzie, Kelburn
- **Wednesday** 15:10 - 16:00 – LT205, Hugh Mackenzie, Kelburn
- **Thursday** 15:10 - 16:00 – LT205, Hugh Mackenzie, Kelburn

25 April 2022 - 05 June 2022

- **Monday** 15:10 - 16:00 – LT205, Hugh Mackenzie, Kelburn
- **Wednesday** 15:10 - 16:00 – LT205, Hugh Mackenzie, Kelburn
- **Thursday** 15:10 - 16:00 – LT205, Hugh Mackenzie, Kelburn

Other Classes

From Weeks 2-12, Helpdesk Sessions will be conducted in CO246. Tutor(s) will be present to assist students who have questions on exercises and assignments. See course wiki at https://ecs.wgtn.ac.nz/Courses/NWEN241_2022T1/ for more details.

Set Texts and Recommended Readings

Required

There are no required texts for this offering.

Recommended

There are many good C/C++ programming books available in the library. Below are some recommended books for this course:

- Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language* [2nd Edition], Prentice Hall, 1988.
- Perry, Gregory, *C Programming Absolute Beginner's Guide*, [Third Edition], Pearson Education, 2014.
- Kochan, Stephen, *Programming in C* [Fourth Edition], Addison-Wesley, 2015.
- Love, Robert, *Linux System Programming* [2nd Edition], O'Reilly, 2013.
- Donahoo, Michael, *TCP/IP Sockets in C* [2nd Edition], Morgan Kaufmann, 2009.
- D.S. Malik, *C++ Programming* [8th Edition], Cengage, 2017.

Mandatory Course Requirements

There are no mandatory course requirements for this course.

- Submit a reasonable attempt at 3/4 of the assignments.
- Obtain a **D** grade or better in the final test.

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 assignments, exercises, mid-term tests, and a final test.

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
Assignments - 4 in total	As stated in the respective assignment handouts.	CLO: 1,2,3,4,5	40%
Exercises - 4 in total	As stated in the respective exercise handouts.	CLO: 1,2,3,4,5	10%
Mid-term Tests (45 mins each) - 2 in total	Weeks 6 and 12	CLO: 1,2,3,4	20%
Final Test (2 hours)	TBC (during assessment period)	CLO: 2,3,4,5,6	30%

Penalties

For the **EXERCISES**. Any exercise submitted after the deadline (normally 23:59 on Fridays) will not be marked and will get 0 marks. There are no "late days" for exercises.

For the **ASSIGNMENTS**. Any assignment if submitted up to 24 hours after the deadline will be penalised by 20%, if submitted between 24 and 48 hours after the deadline will be penalised by 40%. Assignment submitted 48 hours or more after the deadline will not be marked and will get 0 marks.

LATE DAYS POLICY (for Assignments). Each student will have three "late days" which you may choose

to use for any assignment(s) during the course. There will be no penalty applied for these late days. You do not need to apply for these, instead any late days you have left will be automatically applied to assignments that you submit late.

Extensions

Requests for assignment deadline extensions must be sent in writing (email) to the course coordinator, attaching any relevant supporting documents, e.g. medical certificate from doctor.

Submission & Return

Assignments and exercises to be submitted using the ECS online 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.

The School normally has a goal of returning marks for all assessment items within two weeks of the submission deadline. This year, the course will aim to meet this goal, but we expect that sickness and self-isolation due to Covid will extend the time required to mark some reports.

Marking Criteria

As stated in the respective assignment handouts.

Group Work

There is no group work.

Peer Assessment

There will be no peer assessment.

Required Equipment

Refer to https://ecs.wgtn.ac.nz/Courses/NWEN241_2022T1/ for details.

Workload

The total workload for NWEN 241 is 150 hours. In order to maintain satisfactory progress in NWEN 241, you should plan to spend an average of 10 hours per week on this course.

Teaching Plan

See https://ecs.wgtn.ac.nz/Courses/NWEN241_2022T1/LectureSchedule

Communication of Additional Information

You must regularly check the course Wiki page at https://ecs.wgtn.ac.nz/Courses/NWEN241_2022T1/ for the latest information on the course, e.g. lecture schedule, assignments, reading materials, etc.

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-enroll/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: [18315](#)

Points: 15

Prerequisites: COMP 103

Duration: 28 February 2022 - 26 June 2022

Starts: Trimester 1

Campus: Kelburn