

CSCI251: Advanced Programming

Lecturer: Dr. Shixun Huang

SCIT
University of Wollongong

2024 Spring Session

Health and Safety Information for Students

Commencement of Session



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What to do in an emergency?

KEEP CALM – STAY SAFE

If the alarm sounds or you are notified to evacuate:

- Follow instructions of building warden or staff member
- Leave by the nearest safe emergency exit
- Proceed to your emergency evacuation assembly point
- Await further instructions
- Do not return to the building until it is safe to do so

If required to take shelter:

- Follow instructions of building warden or staff member
- Lock doors, close windows/blinds and seek refuge
- Await further instructions

Lecture room: Building 14 – G01

The nearest assembly area for this building is:



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Labs (WOL) are located at Building 3

The nearest assembly area for this building is:



What to do in an emergency?

KEEP CALM – STAY SAFE

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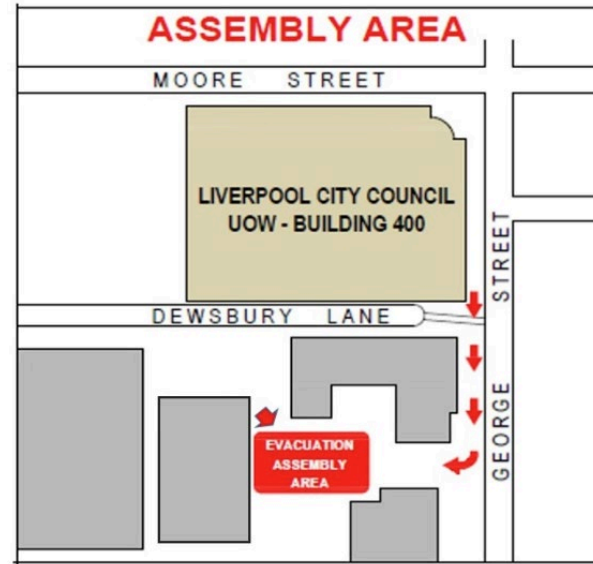
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Liverpool campus

The nearest assembly area for this building is:

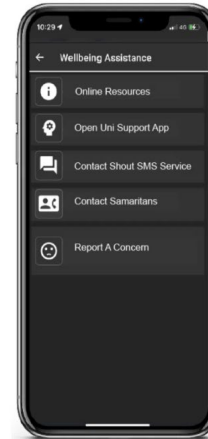
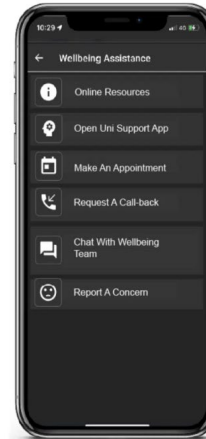
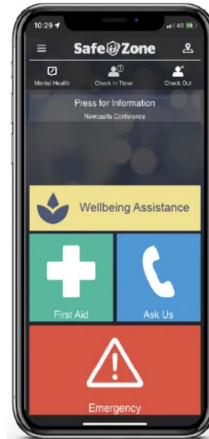


Need assistance on campus?

WE ARE HERE TO HELP

If you require first aid or medical assistance while on campus:

- Locate a first aid officer, or
- Call UOW Security on 4221 4900, or
- Use Wellbeing Assistance, First Aid or Emergency buttons on SafeZone App available free for iOS, Android and Windows.



Reporting hazards

KEEPING YOUR UNIVERSITY SAFE AND COMFORTABLE

If you notice any hazards (e.g. broken furniture or equipment) in your teaching area or anywhere on Campus:

- Report it to your Lecturer/Tutor/Supervisor
- The University has an online hazard and incident reporting tool called SafetyNet
- Report IT equipment hazards to Information Management and Technology Services on 4221 3000
- Report building and grounds hazards to Facilities Management Division on 4221 3217



Smoke-Free University

SAY GOODBYE TO SECONDHAND SMOKE

All UOW public areas including buildings, eating areas, grounds, pathways and transport stops have been smoke-free since July 2016.

This includes the use of vapes and e-cigarettes.

Please co-operate with this policy to help make our campus healthier for everyone.

For more information:

uow.info/smoke-free



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For more information: uow.info/safe-at-work



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Acknowledgement of Country

- We acknowledge the Traditional Custodians of the lands on which the University of Wollongong is situated.
- We pay our respects to Aboriginal Elders past and present, who are the knowledge holders and teachers. We acknowledge their continued spiritual and cultural connection to Country.
- As we share knowledge, teaching, learning and research within this University we also pay respect to the knowledge embedded forever within the Aboriginal Custodianship of Country.



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Workload

- This subject is worth 6 credit points.
 - 1 credit point is equivalent to 2 hours of work
- We have a 2-hour lecture (Wednesday), a 1-hour lecture/tutorial (Thursday), a 2-hour laboratory (week 2 - 12).
- More details can be found from UOW timetable.



Contact hours

SUBJECT CONTACTS

Subject Coordinator

Name	Dr Shixun Huang
Telephone	4239 4845
Email	shixunh@uow.edu.au
Room	3.103
Consultation Times	Tuesday 13:00 - 15:00 Friday 10:00 - 12:00

Make an appointment before you come



Lecture/tutorial

- To support lecture: go through some more examples
- To support lab: go over some lab exercises
- Discussions about assignments

Demonstrator Allocation Details

To efficiently process the large volume of questions, for any question regarding coding, lab and assignment submission, and marks, you are encouraged to directly contact your demonstrators first. If your questions are still not resolved, the demonstrator will report to the subject coordinator.

Wollongong Campus (Week 2 – Week 12):

Lab 1: Day/Time: Wednesday 17:30 – 19:30, Location: 3-125, Demonstrator: Linh Nguyen (languyen@uow.edu.au)

Lab 2: Day/Time: Thursday 17:30 – 19:30, Location: 3-125, Demonstrator: Linh Nguyen (languyen@uow.edu.au)

Lab 3: Day/Time: Friday 08:30 – 10:30, Location: 3-125, Demonstrator: Huanfu Zhang (huanfuz@uow.edu.au)

Lab 4: Day/Time: Friday 12:30 – 14:30, Location: 3-124, Demonstrator: Huanfu Zhang (huanfuz@uow.edu.au)

Lab 5: Day/Time: Friday 14:30 – 16:30, Location: 3-124, Demonstrator: Shixun Huang (shixunh@uow.edu.au)

Liverpool Campus (Week 2 – Week 12):

Lab 1: Day/Time: Thursday 15:30 – 17:30, Location: LP_G-30, Demonstrator: Thi Thu Hang Nguyen (tthnguyen@uow.edu.au)

Lab 2 (online): Day/Time: Wednesday 17:30 – 19:30, Demonstrator: Thi Thu Hang Nguyen (tthnguyen@uow.edu.au)

The online lab link is accessible to cyber academic students on Moodle

Textbook and references

- Lippman, Stanley B.; Lajoie, Josée; Moo, Barbara E.; C++ Primer (5th Edition), 2012.
- Scott Meyers, Effective modern C++, O'Reilly's, 2014.
- Arthur O'Dwyer, Mastering the C++17:STL, 2017.



Other useful resources

- <http://www.icce.rug.nl/documents/cplusplus/>
- <http://www.cplusplus.com/>
- <https://stackoverflow.com/>
- <http://www.cppreference.com/>
- <http://en.cppreference.com/w/>
- <http://www.sgi.com/tech/stl/index.html>
- <https://www.bogotobogo.com/cplusplus/cpptut.php>



Assessment

Three (3) assignments (30%):

Assignment 1: 8%; Procedural Programming; due approx week 6

Assignment 2: 14%; Object Oriented Programming; due approx week 10

Assignment 3: 8%; Generic Programming; due approx week 13

Five (5) laboratories exercises (10%, due week 3,5,7,9,11): Lab Attendance is required.

Each laboratory exercise is to be completed over two weeks and is worth 2%. The marking style is lenient. You must show commitment and get something to work. If your code does not compile because of syntax errors or memory leakage, you cannot expect to get full marks. Each lab exercise is an opportunity for you to practice C++ programming by solving simple problems.

Do not wait the lectures to cover all related stuff before doing the exercises.

Final examination (60%):

Closed-book. Paper-based or online supervised (to be announced later)

Every plagiarised answer will score a zero mark.

Two TF requirements:

At least 40% of the exam marks: 24/60. At least 40% of the laboratory marks: 4/10

Not meeting one of these requirements, and obtaining 50 marks or more overall, *can* result in a TF grade.

GenAI is not allowed to help you write codes for all assessments.

Laboratory exercises

- These exercises are not difficult but you need to preview lectures. They will make you more ready for incoming lectures.

Lab submission time Friday 11:55pm of Session Week 3, 5, 7, 9, 11.

Marking criteria for each lab submission:

Total points: 100 (equivalent to 2% of the overall mark for CSCI251)

There are 5 tasks. For each task:

- It has 20 points.
- Some subtasks have no points but you are encouraged to solve them because they might appear in the final exam.
- If the source code runs and the output is in line with the task requirement, you will get 20 points.
- (else) If not, we check your code. The marking style is lenient and depends on your efforts and commitment.



Laboratory exercises

- CodeBlocks & Visual Studio (desktop application)
 - Work at home
 - Easy to setup/install
- Ubuntu 18.04 (capa.its.uow.edu.au)
 - Ssh login
 - Compiler: GCC 7.5.0
 - Should be C++17 compliant
 - On Ubuntu/capa use g++
- Likely different standard compliant versions won't be 100% compatible.



Some notes on assessment

- Any C++ programs submitted which do not produce the desired results are likely to receive deduction.
- Similarly, if your program doesn't compile.
- Students may query about the marking to the marker within two weeks of receiving the marks.
- If you require additional time to complete an assignment you must submit claims for extensions electronically via SOLS, *before the DUE date*.



Some notes on assessment

- For assignments:
 - 25% penalty per day.
- For labs:
 - Strict 11:55pm Friday deadline for the relevant week.
- For marking Q&A:
 - Students -> Demonstrators -> Subject coordinator



Assessment

- **Assignments are to be submitted to Moodle Site**
- **Email submissions are not not accepted**
- **You must submit an Academic Consideration via SOLS for the extension**
- **The extension is 1 week (maximally)**
- **Without the AC, penalties will apply to all late work. 25% will be deducted each day including weekends.**
- **Submissions are late more than 4 days will get 0 (zero) mark.**



Additional Information

1. A student whose overall performance results in a TF may be granted a supplementary assessment task (e.g. a supplementary exam or a supplementary assignment) if approved by the school assessment committee.
2. A student who achieves a mark of 48-49% will normally be eligible for a grade of WS and a supplementary exam organized by the University. In this case, the maximum grade attainable is PS (Pass Supplementary) and a mark of 50%.



3. A student who has successfully applied for academic consideration will receive either:

A WD - Withheld Deferred Exam - and be allowed to sit only a supplementary exam, or

A WH/WS – Withheld/Withheld Supp Exam – and be allowed to sit a supplementary exam, and your mark can only be 50 PS maximally.

4. If a student is being investigated for misconduct and the investigation cannot be completed before the grades are released, the student will receive a grade of WH until a mark is declared.

5. If your grade is WD/WS/WH and you are a PG, you may not able to attend the graduation ceremony.



Special Consideration Policy

The School recognizes that it has a responsibility to ensure equity and consistency across its subjects for all students. Sometimes, in exceptional circumstances, students need to apply for student special consideration in order to complete all assessable work.

As an example: If a student requires an extension of time for the completion of an assignment this may be granted in certain circumstances. A request for an extension must be made to the Subject Coordinator via SOLS before the due date.



Plagiarism

When you submit an assessment task, you are declaring the following

- It is your own work and you did not collaborate with or copy from others.
- You have read and understand your responsibilities under the University of Wollongong's policy on plagiarism.
- You have not plagiarised from published work (including the internet). Where you have used the work from others, you have referenced it in the text and provided a reference list at the end of the assignment.

Students must remember that:

Plagiarism will NOT be tolerated in this university.



Subject Content Introduction



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Subject Description

- C++ programming language
- three primary components
 - procedural programming
 - object-based/object-oriented programming
 - generic programming.
- Feature topics
 - memory management issues and dynamic memory allocation; classes; STL sequential and associative containers; operator overloading; advanced features in object-oriented programming; templates and exception handling; the latest C++ features (e.g. C++11 and C++14 standards).



Subject Description

- beyond the object-based/object-oriented content of CSIT111 and CSIT121
- beyond the limitations of Java
- main focus: Procedural, object-based, object-oriented, and generic.
- comparison:
 - differences between Java and C++, for example the memory management models.
 - Different C++ version (C++11, 14, 17, ...)



Subject Learning Outcomes

- On successful completion of this subject, students will be able to, to varying degrees:
 - Design and implement solutions to problems with the C++ programming language.
 - Design and implement procedural-based programming to solve problems.
 - Design and implement objects providing encapsulation, inheritance and polymorphism.
 - Design solutions to problems through the use of generic programming.
 - Design object-oriented solutions to problems.
 - Incorporate advanced features in C++ to achieve efficient implementations.



Topics covered ... (roughly)

- C++ Foundations
 - Procedural Programming
 - Control structures
- Getting organised
 - Structures, unions, and randomness
 - Handling files
 - Exceptions (Part 1), namespaces, and defensive programming
- Programming with Class
 - Fundamental syntax and concepts
 - Constructors, Destructors
 - Class/object relations
- Generic Programming :
 - Function templates and compile time functionality
 - Class templating
 - The Standard Template Library (STL)



Assignment coverage

A1: Procedural programming:

- Design.
- Command line argument handling.
- File handling.
- Structs and early collections.
- Randomness.
- Control structures.
- Functions, passing by reference.
- Code organisation.
- Exceptions.



Assignment coverage

A2: Object Oriented programming :

- Design.
- Abstraction.
- Encapsulation.
- Inheritance.
- Other associations.
- Possibly polymorphism.
- Possibly overloading.
- More randomness.



Assignment coverage

A3: Generic programming :

- Class templates.
- Wrapping.
- Classes.
- Libraries.
- Possibly overloading.



Practice makes better ...

- Learn from examples
- Practice variations and learn by making mistakes
- Exercises in the labs are there to help

