



Course Outline



Paper: COMP162 – Foundations of Computer Science

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|----------------------------------|---------------------------|---------------------|--|
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Prescription

S2, SS 0.15 EFTS OL, OC 18 points

An introduction to computer programming suitable for beginners with some prior experience. Builds on and extends basic Java and object-oriented programming. Introduces broader programming concepts and other languages.

P COMP 161 or (COMP 151 passed with a grade of at least B)
R COMP 160
SC Arts and Music, Science

Students entering from COMP151 will be provided with materials and exercises to transfer from Python to the Java programming language.

Students with other programming experience (e.g., appropriate NCEA Level 3 standards) may sit an Advanced Placement Test for direct entry to COMP 162. Enquiries about this option should be directed to adviser@cs.otago.ac.nz in advance of the start of semester.

Paper webpage - <https://www.cs.otago.ac.nz/comp162>

Intended learning outcomes

By completion of this paper students are expected to:

- Understand intermediate concepts relating to computer programming
- Demonstrate the ability to design and develop intermediate computer programs
- Develop knowledge and skills relating to problem solving, program design, object-oriented programming, data structures and algorithms

Workload expectations

This is an 18-point paper which represents 180 hours of work (as per [Otago guidelines](#)). There are 26 scheduled lecture hours and 50 scheduled lab hours, leaving 104 hours for your own study.

Assessment requirements and submission dates

This paper consists of 40% internal assessment, and a 60% final exam.

For internal assessment, you will sit a sequence of “mastery” tests. Each test is graded pass/fail (pass = full marks, fail = zero marks). Each test contributes a certain percentage towards for your final mark (as specified in the table on the next page). For example, if you pass Mastery Test 1 you get 4%.

Mastery tests can be attempted more than once, and in any order. In general, there will be two opportunities every week to attempt a test. To sit a Mastery Test, you must first complete the Mastery Test prep material and be signed off by a lab staff member. You can complete mastery tests at your own pace. However, you must complete Mastery Tests 1 & 2 by the end of Week 5. After this time, you will no longer be able to sit Mastery Tests 1 and 2.

Table 1 – Lab assessment in COMP162

| Assessment | Coverage | Weight | Suggested completion date |
|---------------------------|--------------------|--------|---------------------------|
| MT Prep 1 | Java basics | 1% | |
| Mastery Test 1 | | 4% | Week 2, July 23rd |
| MT Prep 2 | OO and Hierarchies | 1% | |
| Mastery Test 2 | | 4% | Week 4, August 6th * |
| MT Prep 3 | Algorithms | 1% | |
| Mastery Test 3 | | 4% | Week 5, August 13th |
| MT Prep 4 | Recursion | 1% | |
| Mastery Test 4 | | 4% | Week 7, August 27th |
| <i>Mid-semester break</i> | | | |
| MT Prep 5 | Linked lists | 1% | |
| Mastery Test 5 | | 4% | Week 8, September 10th |
| MT Prep 6 | Collections & DS | 1% | |
| Mastery Test 6 | | 4% | Week 10, September 24th |
| MT Prep 7 | R Programming | 1% | |
| Mastery Test 7 | | 4% | Week 11, October 1st |
| MT Prep 8 | C Programming | 1% | |
| Mastery Test 8 | | 4% | Week 13, October 15th |
| <i>Final exams</i> | | | |

* Deadline: Week 5, August 13th

Mastery tests and the practical tests are all held in the COMP162 laboratory under supervision, and must be completed individually. The best preparation for these tests is to work through the exercises in the *COMP162 Lab Book*, available on Blackboard.

Lectures and laboratories

There are two scheduled lectures per week, these are held on Wednesdays and Friday from 9 to 9:50am, in the lecture theatre specified in your eVision timetable. Lectures are all recorded and hosted in Echo360. Links to these recordings are available on Blackboard a short time after the lecture finishes (depending on server load). Students may also make their own recordings if they want to, by arrangement with the lecturer. All lecture notes are available on Blackboard. The Schedule of topics is included at the end of this document.

You will be timetabled into two lab sessions per week, one in the first half of the week (to noon on Wednesday) and one in the second half (from noon on Wednesday). The exception is Week 1 –

there are no labs scheduled in the first half of this week, labs start in the second half of Week 1. Labs are held in a laboratory in the Computer Science Department (Owheo Building), as specified in your eVision timetable. Please attend your timetabled weekly sessions. Lab exercises are specified in the COMP162 Lab Book, which is available on Blackboard.

Attendance requirements

There are no formal attendance or terms requirements, but you should aim to progress through lab exercises and mastery tests at roughly the same rate that the lecture topics are progressing (see the Schedule at the end of this document).

As noted in the section on assessment above, while Mastery Tests can be completed in any order, and generally at your own pace, there is one deadline after MT2. Once the deadline has passed, you will no longer be able to sit MTs 1 and 2. While MTs can be completed at your own pace, and in any order, we recommend that you aim to make steady progress on the mastery tests in a sequential fashion, so that you achieved your desired mark for the course. It is your responsibility to plan and monitor your own progress.

Reading requirements and learning materials

The main learning materials for the course are the COMP162 Lecture Notes and the COMP162 Lab Book (as described in the section Lectures and laboratories above). Both are available on Blackboard (under the section Course Documents). Each lecture will have recommended readings, often drawn from two free online textbooks, as described in the lecture notes. There is no required hardcopy textbook.

Computing resources and other technologies

This course uses the jGRASP integrated development environment (IDE) to write programs in the Java programming language. jGRASP is available on the machines in your timetabled laboratories, and may also be available on the Otago Student Desktop (Start Menu / Course Specific Resources / Computer Science). It is free to install on your own machine (Mac, Windows or Linux). (The recommended version of jGRASP includes an installation of Java). Comparative languages including C, R, and Python, will be taught with several different text editors and IDEs. Information on these will be found in the COMP162 Lab Book.

This course uses Blackboard to distribute resources (including the lecture notes and lab book) and for course announcements. Please check Blackboard for announcements regularly, and monitor your email (make sure that your student email forwards to your preferred email account if necessary). This course also uses Moodle (a learning management platform similar to Blackboard) to administer mastery tests in our labs.

Support available

For general learning (beyond course materials and staff listed above) see the resources at [Student Learning Development](#). Various organisations can provide support for [Māori](#) and [Pacific](#) students. Students with disabilities or impairments should contact the [Otago Disabilities Information and Support Office](#). The Computer Science Department also provides support in [many cases](#). Please contact the course coordinator if you have any special requirements.

Academic integrity and acceptable academic practice

The standard Otago policies apply, see for example [here](#), [here](#), [here](#).

Class representatives

Otago has a system of [class representatives](#). When appointed for COMP162, they will be listed on Blackboard.

Lecture schedule

Lectures are held twice a week for the 13 teaching weeks of the semester. Lecture topics and dates are listed in Table 2.

Table 2 – Lecture schedule for COMP162

| Lecture | Title / topic | Date |
|---------------------------|--|----------------------------|
| 1 | Introduction and Ethics in Computing | July 14 th |
| 2 | Programming and algorithms | July 16 th |
| 3 | Java basics | July 21 st |
| 4 | Classes and inheritance | July 23 rd |
| 5 | Inheritance and polymorphism | July 28 th |
| 6 | Packages, interfaces, and abstract classes | July 30 th |
| 7 | Algorithms | August 4 th |
| 8 | Recursion | August 6 th |
| 9 | Analysis of algorithms | August 11 th |
| 10 | Array algorithms | August 13 th |
| 11 | Lists | August 18 th |
| 12 | Linked lists | August 20 th |
| 13 | Generics and collections | August 25 th |
| 14 | Stacks | August 27 th |
| <i>Mid-semester break</i> | | |
| 15 | Queues | September 8 th |
| 16 | Insertion and Selection sort | September 10 th |
| 17 | Quicksort | September 15 th |
| 18 | Object orientated programming | September 17 th |
| 19 | Object orientated programming | September 22 nd |
| 20 | C programming 1 | September 24 th |
| 21 | C programming 2 | September 29 th |
| 22 | Functional programming in Python | October 1 st |
| 23 | Functional programming in Python | October 6 th |
| 24 | Array programming in R | October 8 th |
| 25 | Array programming in R | October 13 th |
| 26 | Exam review & wrap-up | October 15 th |
| <i>Final exams</i> | | |

Disclaimer

Every effort is made to ensure that the information contained in this document is accurate, but it is subject to change / correction. Changes will be notified via Blackboard. You are encouraged to check Blackboard regularly. It is your responsibility to be informed.