

# COSC122

## Computer Science 1B Course Outline for 2012

course supervisor: *Tim Bell*

---

12 January 2012 – this is a preliminary version and is subject to change.

Most information for COSC122 (including this document) will be available to enrolled students from the learning management system at <http://learn.canterbury.ac.nz>. You should regularly refer to this site for updated information, copies of course handouts, quizzes, due dates, and discussions about course topics.

### What is this course trying to teach?

This course develops a thorough understanding of basic data structures and algorithms that are commonly used in software development, and introduces you to broad concepts from Computer Science that enable you to develop effective programs. A series of labs and assignments will give you practice applying the ideas you learn in lectures. Along the way, you'll gain an understanding of why different data structures and algorithms are needed, the applications they are suited for, and the advantages and disadvantages of their possible implementations.

Specifically, the goals of the course are:

- To provide students with a sound foundation in Computer Science
- To give students experience with common algorithms and data structures used in Computer Science

### Who teaches this course?



#### Tim Bell

Tim is the course supervisor and lecturer.

[tim.bell@canterbury.ac.nz](mailto:tim.bell@canterbury.ac.nz), Room 340 (temporarily), 303 (eventually)



#### Richard Green

Richard is a lecturer for the course.

[richard.green@canterbury.ac.nz](mailto:richard.green@canterbury.ac.nz), Room 245



#### Amali Weerasinghe

Amali is the main tutor for the course.

[amali.weerasinghe@canterbury.ac.nz](mailto:amali.weerasinghe@canterbury.ac.nz)

In addition, there will be tutors whose photos and contact details will be available on the department's web pages.

## Prerequisites

The course assumes that you are proficient in Python, as taught in COSC121. It is possible to take COSC121 and COSC122 concurrently, but if you don't have significant computing experience (especially programming) then this is not advised.

## Textbooks

The text book is "Problem Solving with Algorithms and Data Structures using Python", by Miller and Ranum, second edition (unless a new one becomes available by midyear). The course will follow the text closely, and it is strongly recommended that you buy a copy. The book is available at the University Bookshop; the price in 2011 was \$65.70 (including student discount). The first edition was used in 2010, and second-hand copies may be available; it is suitable as a text. References will be given for both books.

## Lectures and labs

- There are three hours of lectures per week. The locations of the lectures are subject to change; please check the Course Information System online.
- There are two hours of labs per week. You can choose your stream after Tuesday in the first week of term (via the Learn system), and labs begin in the second week of term.

## Assessment

The assessment will be roughly as follows; details will be confirmed by the second week of term:

- Lab: 10%
- Assignment: 20%, due in term 4.
- Mid-semester test: 20% of final grade, date to be confirmed (will be late term 3 or early term 4), one hour. Closed book. This test will cover lecture material from the third term.
- Exam: 50% of final grade, date to be announced, two hours. Closed book. This exam will cover the whole semester's work (including that covered in the mid-semester test), but will primarily focus on material covered in lectures given in the second half of the semester.

## Grading Policy

The Computer Science department has the following grading policy. In order to pass a course you must meet the *absolute* passing mark for the class; i.e. the weighted average of your scored items must meet the absolute passing mark set for the class. Marks are sometimes scaled to achieve consistency between courses from year to year. Specific passing marks are therefore set on a class-by-class basis. A total mark of 50% would typically be required to achieve a C- pass; although this may vary. Passing a course with a C- indicates that we believe that you have *just* mastered the relevant material.

In addition, you must score an average mark of 45% on all invigilated work.

The online notices on [learn.canterbury.ac.nz](http://learn.canterbury.ac.nz) are the *only* definitive source of information on tests.

## Other important information

There are several important documents available online about departmental regulations, policies and guidelines that you need to be aware of.

<http://www.cosc.canterbury.ac.nz/regulations/>

Notices about this class will be posted to the class forum in the Learn system ([learn.canterbury.ac.nz](http://learn.canterbury.ac.nz)). COSC students will also be made members of a class called "CSSE Notices", where general notices will be posted that apply to all classes (such as information about building access or job opportunities).

## Lecture Schedule

The topics covered in lectures will be as follows. The main references are for the current edition of the text book (2<sup>nd</sup> edition). Where a reference is given in square brackets, it is for the first edition.

- Introduction to algorithms, and the relationship with Software Engineering
- Algorithm analysis (Chapter 2 [4])
- Basic data structures – stacks and queues (Chapter 3 [2])
- Lists (Chapter 3 [7])
- Recursion (Chapter 4 [3])
- Searching (Chapter 5 [4])
- Sorting (Chapter 5 [4])
- Trees – binary trees and heaps (Chapter 6 [5])
- Graphs – introduction only (Chapter 7 [6])
- Introduction to major ideas in Computer Science