122COM: Module Guide

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1 Prior Learning

A basic prior knowledge of programming in assumed, Python3 in particular. The expectation is that students will have successfully complete 121COM before attempting this module.

2 Assesmesnt

Assessment of this module is 100% by coursework and is broken down as follows:

- Phase test 1 - To be held in week 5/6 of the semester.
- Phase test 2 - To be held in week 10/11 of the semester.
- Activity Lead Learning (ALL) project - Course specific.

The phase tests are online multiple choice quizes. They will be held under exam conditions during your 122 labs. The week that your phase test occurs in will depend on your cohort, see table 1 on page 4 for more detail.

The majority of your marks will come from your course specific ALL group projects.

2.1 Marking breakdown

- 20% - Phase test 1
- 20% - Phase test 2
- 60% - ALL project

3 Languages

The primary languages for the module will be Python3 and C++11. It is assumed that you will have a working knowledge of Python before you attempt this module.

C++ will be introduced during the module, the majority of students will be expected to work on lab material in C++ and may be tested on C++ syntax during the phase tests.

The exceptions are BIT and Media students who will be expected to complete some C++ labs but will not be asked questions regarding C++ syntax during the phase tests. They may, however, be asked generalised questions regarding C++ in comparison to Python and about differences in programming languages.

110 resit students who are only taking a subsection of this module will not be expected to write any C++ code. They may, however, be asked generalised questions regarding differences in programming languages.

4 Contact

The module runs in one semester over 11 weeks. There are 2 hours of contact time a week split into one 1 hour lecture and one 1 hour lab sessions. Students are expected to spend an additional 4 hours a week in self study.

Additional support will be available as part of the programming support sessions `https://gitlab.com/coventry-university/programming-support-lab/wikis/home`

5 Reading

There is no required reading for this module. If students request a text book then the following can be recommended.

5.1 Python

It is assumed that students will already have a working Python knowledge but if further help is necessary then:

- Mark Lutz Learning Python, 5th Edition. Paperback, OReilly

5.2 C++

All the nessicary C++ for this module will be covered during the lectures and labs but if further resources are required then:

- Mike McGrath - C++ Programming In Easy Steps, 4th Edition. Paperback (In Easy Steps)
- Penguin programmer - An excellent beginners C++ guide. `http://www.penguinprogrammer.co.uk/c-beginners-tutorial/`.
- Learncpp - A more advanced C++ guide that goes into greater depth. `http://www.learncpp.com/`

6 Module structure

122COM will be taught as lecture/lab pairs. A new topic will be introduced each week in the lecture and will be accompanied with coding exercises to be completed during the lab.

Lecture and lab material will be marked using the same traffic light system used in 121COM.

Understanding the green material is required to pass the module.

Understanding yellow material should produce a good mark.

Red material is advanced and should be attempted by students with previous coding experience or students that are looking to stretch themselves. It is not examinable.

6.1 Topics

- SQL
  - *Python only*
  - SQL
  - Calling SQL from Python
  - SQL injection
- GUIs
  - *Python only*
  - Components
  - Layout
  - Events
- C++
  - *C++ only*
  - Static typing
  - Syntax
  - Compiling
- Searching
  - Linear
  - Binary
  - String
- Performance
  - Profiling
  - Big O notation
- Memory
  - *C++ only*
  - Static vs. dynamic memory
  - Allocation
  - Deallocation
  - Pointers
  - References
  - Smart pointers
- Structures
  - Arrays
  - Linked lists
  - Abstract Data Types (ADTs)
  - Queues
  - Stacks
  - Sets
- Sorting
  - Bubble
  - Selection
  - Quick
- Hashing
  - Hashing
  - Hash tables
  - Bloom filters
- Testing
  - Unit testing
  - Automated unit testing

6.2 Weekly Plan

This module assumes that the lecture material is presented before the lab work is attempted. Since some cohorts will have their labs scheduled before their lecture (Computer Science and BIT students) the first lab session of the term will be a recap of 121COM with no lecture in order to bring all cohorts in sync.

Week	Computer Science & BIT		Everyone else	
	Lab	Lecture (fri)	Lecture (mon)	Lab
1	121 recap	SQL	SQL	SQL
2	SQL	GUIs	GUIs	GUIs
3	GUIs	C++	C++	C++
4	C++	Searching	Searching	Searching
5	Searching	Performance	Performance	Performance
6	Performance	Memory	Memory	Memory
7	Memory	Structures	Structures	Structures
8	Structures	Sorting	Sorting	Sorting
9	Sorting	Testing	Testing	Testing I
10	Testing I	Recap/MEQ (tues)	Recap/MEQ	Testing II
11	Testing II	Hashing	Hashing	Hashing

Table 1: Weekly topic plan (may change), highlighted labs contain phase tests.