

The Hong Kong University of Science and Technology

UG Course Syllabus

Course Title: Object-Oriented Programming and Data Structures

Course Code: COMP 2012

No. of Credits: 4 credits

Pre-requisites: COMP 2011

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Course Description

To learn the fundamental concepts and techniques behind object-oriented programming. They include abstract data types; creation, initialization, and destruction of objects; class hierarchies; polymorphism, inheritance, and dynamic binding; generic programming using templates. To learn the object-oriented view of data structures: linked lists, stacks, queues, binary trees, and algorithms such as searching and hashing.

List of Topics

1. Revision of dynamic data structures
2. C++ class basics
3. Separation compilation and makefile
4. Constructors, destructor, initialization
5. Inheritance, polymorphism, and dynamic binding
6. Generic programming
7. Namespace
8. Static member functions/data
9. rvalue reference and move semantics
10. Hashing
11. Binary search trees
12. STL (optional)

Assessments:

Assessment Task	Contribution to Overall Course grade (%)
Laboratory exercises	10%
Programming assignments	24%
Midterm examination	26%
Final examination	40%

Required Texts and Materials

Textbooks

Paul Deitel, Deitel & Associates (2017). **C++ How to Program.**

M.A. Weiss (2014). **Data Structures and Algorithm Analysis in C++.**

Clifford A Shaffer. **Data Structures and Algorithm Analysis** Ed. 3.2 (C++ Version; electronic version: [http://people.cs.vt.edu/~shaffer/Book/C++3elatest.pdf.](http://people.cs.vt.edu/~shaffer/Book/C++3elatest.pdf))

Reference books

B. Eckel (2000). **Thinking in C++.**

L. Nyhoff (2005). **ADTs, Data Structures and Problem Solving with C++.**

Stanley Lippman (2013). **C++ Primer.**