

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Computer Science  
with effect from Semester A 2018/19**

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**Part I Course Overview**

**Course Title:** Computer Programming

**Course Code:** CS2313

**Course Duration:** One semester

**Credit Units:** 3 credits

**Level:** B2

Arts and Humanities

**Proposed Area:**  
*(for GE courses only)*

Study of Societies, Social and Business Organisations

Science and Technology

**Medium of Instruction:** English

**Medium of Assessment:** English

**Prerequisites:** CS1103B Media Computing or  
(Course Code and Title) CS1303 Introduction to Internet and Programming or equivalent

**Precursors:** Nil  
*(Course Code and Title)*

**Equivalent Courses:** Nil  
*(Course Code and Title)*

**Exclusive Courses:** CS2310 Computer Programming  
(Course Code and Title) CS2311 Computer Programming

## Part II Course Details

### 1. Abstract

(A 150-word description about the course)

This course aims to equip the students with in-depth concepts and techniques of programming using a high-level object-oriented programming language and to develop practical skills in producing quality programs.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs <sup>#</sup>	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Explain the structure of an object-oriented computer program.	10%	✓	✓	
2.	Analyze, test and debug computer programs.	15%	✓	✓	
3.	Solve a task by applying effective programming techniques, which involve advanced skills like using recursion and dynamic data structures.	60%	✓	✓	✓
4.	Design and construct well-structured programs with good programming practices.	15%	✓	✓	✓
		100%			

\* If weighting is assigned to CILOs, they should add up to 100%.

<sup>#</sup> Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

### 3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

Teaching pattern:

Suggested lecture/tutorial/laboratory mix: 2 hrs. lecture; 2 hrs. laboratory

TLA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Lecture	Various programming concepts and techniques will be introduced, explained and demonstrated with examples.	✓	✓	✓	✓	
Lab	The laboratory sessions are designed to enable the students to put theory into practice and be proficient in a programming language. The laboratory exercises consist of programming tasks and students can try out their programs using a common integrated development environment. Feedback will be given to students on their work.	✓	✓	✓	✓	
Assignments	The assignments are more challenging tasks compared with laboratory exercises. The students need to analyze the requirements and design programming solutions by applying and combining various techniques learnt from lectures and laboratory exercises. They are also required to implement their solutions as practical computer programs, and to explain their ideas/algorithms using suitable presentation methods (e.g. a report, flowchart, etc.).		✓	✓	✓	

### 4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.				Weighting*	Remarks
	1	2	3	4		
Continuous Assessment: <u>40%</u>						
Quiz	✓	✓	✓	✓	20%	
Assignments		✓	✓	✓	20%	
Examination <sup>^</sup> : <u>60%</u> (duration: 2 hours)						
					100%	

\* The weightings should add up to 100%.

<sup>^</sup> For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

## 5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Lab	1.1 ABILITY to UNDERSTAND and APPLY object-oriented programming concepts and techniques by designing, analyzing, testing, and debugging computer programs	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Quiz	2.1 ABILITY to EXPLAIN object-oriented programming concepts and techniques  2.2 APPLY learnt knowledge to solve a simple programming task	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Assignment	3.1 ABILITY to APPLY learnt knowledge to solve a task by designing, analyzing, testing, and debugging computer programs	High	Significant	Moderate	Basic	Not even reaching marginal levels

## Part III Other Information (more details can be provided separately in the teaching plan)

### 1. Keyword Syllabus

*(An indication of the key topics of the course.)*

Program design, development of algorithms, programming language, control structures, data types, multidimensional arrays, file I-O, recursion, pointers and dynamic data structures, object-based programming: data abstraction, classes, and the class library; programming style, program testing, exception handling.

#### Syllabus

1. Computers and programming  
Hardware/software hierarchy, the computer as a multi-level language machine. The software development process. Program development environments.
2. Programming techniques and the development of algorithms  
Algorithms, programming language, modular decomposition and procedural abstraction, automatic and dynamic variables, parameter-passing by reference and by value for atomic data, objects, and arrays, control structures, iteration, recursion, exception handling.
3. Data structures  
The concept of data types. Simple data types. Arrays. Strings. Files. Data abstraction: encapsulation, information hiding. Defining and using classes. The class library. Pointers. Dynamic data structures (eg. Dynamic array, linked list).
4. Program development practice  
Professional programming styles. Program testing. Program documentation.

### 2. Reading List

#### 2.1 Compulsory Readings

*(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)*

1.	C.K. Poon & Matthew Chang (2007). <i>Concepts and Techniques in C++ Programming</i> . McGraw Hill.
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#### 2.2 Additional Readings

*(Additional references for students to learn to expand their knowledge about the subject.)*

1.	Walter Savitc (2010). <i>Absolute C++</i> . Addison-Wesley, 4 <sup>th</sup> edition.
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