

**The Hong Kong Polytechnic University  
Hong Kong Community College**

**Subject Description Form**

<b>Subject Code</b>	CCN2239
<b>Subject Title</b>	Data Structures
<b>Level</b>	2
<b>Credit Value</b>	3
<b>Medium of Instruction</b>	English
<b>Pre-requisite / Co-requisite/ Exclusion</b>	<b>Pre-requisite</b> CCN2042 Computer Programming
<b>Objectives</b>	This subject aims to equip students with basic concepts of data structures and algorithms. It provides students with an understanding to apply simple data structures and algorithms in developing computer programs with a high-level programming language.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> <li>(a) describe the properties of basic data structures.</li> <li>(b) identify the strengths and weaknesses of different data structures.</li> <li>(c) apply the knowledge of various common algorithms.</li> <li>(d) design and employ appropriate data structures and algorithms for developing computer applications using a high-level language, such as Java.</li> <li>(e) examine the data structures and algorithms for the improvement in the solutions.</li> </ul>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Programming and algorithms</b></p> <p>Computer algorithms; Types of algorithms; Data structures; Abstract data types.</p> <p><b>Data structures: representation and algorithms</b></p> <p>Linear structures: linked-lists, stacks, queues; Tree structures: binary trees, balanced trees, tree traversals.</p> <p><b>Sorting</b></p> <p>Common sorting algorithms: bubble sort, insertion sort, selection sort; Optimal-time sorting algorithms: quick sort, merge sort, heap sort.</p>

	<p><b>Searching</b></p> <p>Common searching algorithms: sequential search, binary search; Advanced searching algorithms: tree search, and hashing.</p> <p><b>Applications</b></p> <p>Practical program development using combination of various data structures and algorithms for business applications</p>																																																							
<p><b>Teaching/Learning Methodology</b></p>	<p>Lectures focus on the introduction and explanation of concepts and theories supported by hypothetical and real examples wherever appropriate. Discussions and activities might be arranged to stimulate students' interest or their awareness of practical implications of some concepts.</p> <p>Tutorials provide students with the opportunity to deepen their understanding and to explore further the applications of concepts and theories taught. In the tutorials, students will be required to design and develop software solutions to practical problems by applying appropriate data structures and algorithms.</p>																																																							
<p><b>Assessment Methods in Alignment with Intended Learning Outcomes</b></p>	<p>A variety of assessment tools will be used to develop and assess students' achievement of the subject intended learning outcomes.</p> <table border="1" data-bbox="507 990 1356 1572"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="5">Intended subject learning outcomes to be assessed</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> </tr> </thead> <tbody> <tr> <td><b>Continuous Assessment*</b></td> <td><b>60</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>▪ Test</td> <td>24</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>▪ Assignment 1</td> <td>18</td> <td></td> <td>✓</td> <td></td> <td>✓</td> <td>✓</td> </tr> <tr> <td>▪ Assignment 2</td> <td>18</td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td><b>Final Examination</b></td> <td><b>40</b></td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td><b>Total</b></td> <td><b>100</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><i>*Continuous assessment items and/or weighting may be adjusted by the subject team subject to the approval of the College Programme Committee.</i></p> <p>To pass this subject, students are required to obtain Grade D or above in <b>both</b> the Continuous Assessment and Final Examination.</p>		Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					a	b	c	d	e	<b>Continuous Assessment*</b>	<b>60</b>						▪ Test	24	✓	✓	✓			▪ Assignment 1	18		✓		✓	✓	▪ Assignment 2	18			✓	✓		<b>Final Examination</b>	<b>40</b>	✓	✓	✓	✓	✓	<b>Total</b>	<b>100</b>					
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<p><b>Student Study Effort Expected</b></p>	<p><b>Class contact</b></p> <ul style="list-style-type: none"> <li>▪ Lecture</li> <li>▪ Tutorial</li> </ul> <p><b>Other student study effort</b></p> <ul style="list-style-type: none"> <li>▪ Self-study</li> </ul>	<p><b>Hours</b></p> <p>26</p> <p>13</p> <p>54</p>																																																						

	<ul style="list-style-type: none"> <li>▪ Continuous Assessment</li> </ul>	39
	<b>Total student study effort</b>	<b>132</b>
<b>Reading List and References</b>	<p><b>Recommended Textbook</b></p> <p>Drozdek, A. (2013). <i>Data Structures and Algorithms in Java</i>. (4<sup>th</sup> ed.), Cengage Learning.</p> <p><b>References</b></p> <p>Goodrich, M.T. &amp; Tamassia, R. (2014). <i>Data Structures and Algorithm Analysis in Java</i>. (6<sup>th</sup> ed.), Wiley.</p> <p>Padma Reddy, A.M (2019). <i>Data Structures and Applications: A Simple and Systematic Approach</i>. (1<sup>st</sup> ed.), Cengage Learning.</p> <p>Weiss, M. A. (2012). <i>Data Structures and Algorithm Analysis in Java</i>. (3<sup>rd</sup> ed.), Pearson Education.</p>	