1. **Title of the module**

COMP5510 (CO551) - Data Structures and Algorithms

1. **School or partner institution which will be responsible for management of the module**

School of Computing

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 5

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Autumn

1. **Prerequisite and co-requisite modules**

Pre-requisite: COMP3200 Introduction to Object-Oriented Programming

 COMP3220 Foundations of Computing I

1. **The programmes of study to which the module contributes**

BSc Computing

BSc Computing with a Year in Industry

BSc Computing (Consultancy)

BSc Computing (Consultancy) with a Year in Industry

BSc Business Information Technology

BSc Business Information Technology with a Year in Industry

1. **The intended subject specific learning outcomes.
On successfully completing the module students will be able to:**

8.1. Read and write algorithms in pseudocode;

8.2. Implement and use abstract data structures;

8.3. Use known algorithms to solve programming problems;

8.4. Appreciate the impact on memory usage and computation speed to make informed decisions about the most appropriate data structures and algorithms to use when designing software;

1. **The intended generic learning outcomes.
On successfully completing the module students will be able to:**

9.1. Demonstrate an understanding of trade-offs when making design decision about data structures and algorithms;

9.2. Make effective use of existing techniques to solve problems;

9.3. Analyse and compare solutions to programming problems;

1. **A synopsis of the curriculum**

Fundamentals: Pseudocode; Primitive and object types; Multi-dimensional arrays; Resizing arrays; Loops; conditionals and recursion

Data structures and algorithm design: Dynamic data structures, such as linked lists, trees, maps, heaps, bags, queues (priority queues) and stacks (LIFO/FIFO); Sorting and searching algorithms; Graphs and graph algorithms (depth, breadth-first search and shortest path).

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

Algorithms. Robert Sedgewick and Kevin Wayne. Addison-Wesley, 4th Edition, April 2011.

Data Structures and Algorithms in Java. Michael T. Goodrich, Roberto Tamassia and Michael H. Goldwasser. John Wiley & Sons, 6th Edition, August 2014.

Java Structures. Duane Bailey. McGraw Hill, December 1997.

The art of computer programming. Donald E. Knuth. Addison-Wesley, 3rd Edition, July 1997.

Introduction to algorithms. T. Cormen, C. Leiserson, R. Rivest and C. Stein. MIT Press, 3rd Edition, August 2009.

1. **Learning and teaching methods**

Total contact hours: 32

Private study hours: 118

Total study hours: 150

1. **Assessment methods**
	1. Main assessment methods

Data structures assignment – 25%

In-class test – 25%

2-hour unseen written examination – 50%

13.2 Reassessment methods

Like for like.

1. **Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | *8.1* | *8.2* | *8.3* | *8.4* | *9.1* | *9.2* | *9.3* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |
| Lectures | **x** | **x** | **x** | **x** |  | **x** | **x** |
| Practical classes | **x** | **x** | **x** | **x** |  | **x** |  |
| Private study | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Coursework | **x** | **x** | **x** | **x** |  | **x** |  |
| **Assessment method** |  |  |  |  |  |  |  |
| *Coursework(practical exercises)* | **x** | **x** | **x** | **x** |  | **x** |  |
| *Examination (2-hour)* | **x** |  |  | **x** | **x** |  | **x** |

1. **Inclusive module design**

The School recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Medway

1. **Internationalisation**

The topics addressed by this module relate to a field which is of international importance, given the global role of computers in today's technological innovation. The topics covered by this module are international in nature, being identical worldwide and independent of traditional spoken language.

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**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
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Revised FSO Jan 2018