1. **Title of the module**

COMP5180 (CO518) - Algorithms, Correctness & Efficiency

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

Division of Computing, Engineering, Mathematical Sciences (CEMS)

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 or Spring

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

Pre-requisite: COMP5200: Further Object-Oriented Programming

 COMO3250: Foundations of Computing II

 COMP3830: Problem Solving with Algorithms

Pre-requisite: COMP5230: Fundamentals of Programming and Logic

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

BSc Computer Science and all variants, BSc Computing, BSc Software Engineering

with a year in industry variants of these programmes.

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

8.1 specify, test, and verify program properties;

8.2 analyse the time and space behaviour of simple algorithms;

8.3 use known algorithms to solve programming problems;

8.4 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 decisions;

9.2 make effective use of existing techniques to solve problems;

9.3 demonstrate an understanding of how programs (can fail to) match a specification;

9.4 analyse and compare solutions to technical problems.

1. **A synopsis of the curriculum**

The curriculum covers topics in algorithms and data structures, such as hashing and graph algorithms. It addresses how to program such algorithms, as well as how to test them, reason about their correctness and analyse their efficiency. It includes a mathematical treatment of big-O notation.

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

The Art of Computer Programming. Donald E. Knuth

The Algorithm Design Manual. Steven S. Skiena

Graphs and Applications. Joan Aldous and Robin Wilson

Graphs, Networks and Algorithms. D. Jungnickel

Data Structures and Algorithms in Java 2nd Edition. M.T. Goodrich and R. Tamassia

Algorithms and Data Structures 2nd Edition. Jeffrey H. Kingston x

The Science of Programming. David Gries.

1. **Learning and teaching methods**

Total contact hours: 33

Private study hours: 117

Total study hours: 150

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

2 programming assessments (15 hours each) (25% each)

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)**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | *8.1* | *8.2* | *8.3* | *8.4* | *9.1* | *9.2* | *9.3* | *9.4* |
| **Lectures** | x | x | x | x | x | x | x | x |
| **Private Study** | x | x | x | x | x | x | x | x |
| **Assessment method** |  |  |  |  |  |  |  |  |
| *Exam* | x | x | x | x | x | x | x | x |
| *Coursework* | x | x | x | x | x | x | x | x |

1. **Inclusive module design**

The Division 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**

Canterbury

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.

**DIVISIONAL USE ONLY**

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

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| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 23/11/2020 | Minor | September 2021 | 7 | No |
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