

Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level (CPD)#
CMPU1026					10	6
Module Title	Programming & Algorithms 1					

Programming and Algorithms 1

School Responsible:	School of Computing
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Module Overview:

This module is an introduction to programming, program design and algorithms. Students are introduced to a modern programming language and to commonly used algorithms and their implementation.

This module assumes no prior knowledge of programming or algorithms.

The aims of this module are to:

- Teach the fundamentals of programming
- Teach the principles of good program design, implementation, documentation and testing.

Teach the theory and application of elementary algorithms and data structures.

Learning Outcomes (LO):

On Completion of this module, the learner will be able to

1	Learn the mental strategies appropriate for program design and development.
2	Use of appropriate tools and environments for software development.
3	Understand the concept of abstraction, hiding and modularity in programming.
4	Test computer programs to ensure compliance with requirements.
5	Implement elementary algorithms and data structures.

Indicative Syllabus:

- Introduction: What is a program? Source code. Machine code. Editing, Compiling, Linking Debugging. Use of an Integrated Development Environment (IDE).
- Basic Data Types: integer, floating-point and character data and variables.
- Basic Input-Output: Display data on a screen. Input data from the keyboard.
- Programming Structures: Conditional statements: Boolean values and expressions, logical and relational operators, if-statement, case-statement, compound conditional statements.
- Iterative constructs: while-statements, for-statements and nested control statements.
- Structured Programming: functions, parameter passing, returning values.
- Introduction to Data Structures: single-dimensional arrays, two-dimensional arrays, dynamically allocated arrays,

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- Basic Algorithms: summation, counting, numeric operations, swapping, maximum and minimum, simple array manipulation.
- Elementary Sorting Algorithms: Internal Sorting. Exchange sort. Interchange sort. Bubble sort. Shaker sort. Insertion sort.
- Testing and debugging: Objectives and principles of testing. Choosing appropriate test data. Simple debugging using a program trace.
- Documentation: Style guidelines.

Learning and Teaching Methods:

The course delivery involves a combination of lectures and labs which may incorporate the use of blended learning techniques as appropriate throughout the delivery.

Total Teaching Contact Hours	39
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Total Self-Directed Learning Hours	148
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Module Delivery Duration:

This module is delivered over one semester

Assessment

Assessment Type	Weighting (%)	LO Assessment (No.)
Final Exam	70	1-5
In Class Examination	30	1-5

Module Specific Assessment Arrangements (if applicable)

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|---|--|
| (a) Derogations from General Assessment Regulations | |
| (b) Module Assessment Thresholds | |
| (c) Special Repeat Assessment Arrangements | |

Essential Reading: (author, date, title, publisher)

- Depending on the procedural language used in this module, specific reading lists will be specified in advanced of the start of the module.

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Supplemental Reading

- Robert Sedgewick (1997), Algorithms in C, Parts 1-4: Fundamentals, Data Structures, Sorting, Searching (3rd Edition), Addison-Wesley
- T Cormen, C Leiserson, R Rivest, C Stein (2009), Introduction to Algorithms, MIT Press

Version No:		Amended By	
Commencement Date		Associated Programme Codes	

Modules that are to be offered as Stand-Alone CPD Programmes must have an NFQ level assigned

*Details of the assessment schedule should be contained in the student handbook for the programme stage.

Date of Academic Council approval

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