

Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level (CPD)#
CMPU2000	CMPU 1026				10	6
<b>Module Title</b>	Programming Paradigms & Data Structures					

### Programming Paradigms and Data Structure

<b>School Responsible:</b>	School of Computing
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#### Module Overview:

The aim of this module is to introduce the student to a number of intermediate issues in the design and development of algorithms. The student will be given an introduction to a range of programming paradigms and prototypical languages associated with each paradigm. Common programming language issues such as memory allocation, and parameter passing will be examined. The module assumes the student has a preliminary understanding of programming design.

#### Learning Outcomes (LO):

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

<b>1</b>	Explain the relationships between the most prevalent programming paradigms as well as a number of specific programming languages
<b>2</b>	Demonstrate an understanding of memory management issues, including pointer use in programming
<b>3</b>	Implement and understand a the concept of data structures
<b>4</b>	Discuss issues of programming language choices and algorithm design in the context of Information Systems and Information Technology
<b>5</b>	Discuss an understanding of the role of the editor, compiler, and interpreter in programming
<b>6</b>	Write programs that can interact with persistent data stores such as text files and binary files.

#### Indicative Syllabus:

Indicative syllabus covered in the module and / or in its discrete elements

Programming Paradigms

- The Programming Language & Paradigm Spectrum: Assembly Language; Imperative Language; Object Oriented Programming; Logical Languages; Scripting; Functional Languages.

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- Pros and Cons of Programming Language Types.
- Role of different Programming Paradigm Types across technology infrastructure and applications
- Compilation versus interpretation of computer code
- Imperative Programming
  - Compiled language design and execution
  - Parameter passing in compiled languages
  - Explicit memory allocation and deallocation in programming languages
  - Pointers and memory addressing in programmes
  - Relationship between explicit memory deallocation and garbage collection in high level programming languages

#### Data Structures

- The role of the data structure
- Data structures for information aggregation
- Simple data structures: lists, stacks and queues with linked lists

#### Practical Programme Development

- The programming tool chain
- Command Line Environments
- Integrated Development Environments

#### 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.

<b>Total Teaching Contact Hours</b>	39
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<b>Total Self-Directed Learning Hours</b>	148
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#### Module Delivery Duration:

This module is delivered over one semester

#### Assessment

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Assessment Type	Weighting (%)	LO Assessment (No.)
Final Exam	60%	1-8
In Class Examination	40%	2,3,6
<b>Module Specific Assessment Arrangements (if applicable)</b>		
(a) Derogations from General Assessment Regulations		
(b) Module Assessment Thresholds		
(c) Special Repeat Assessment Arrangements		

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

- Thomas H. Cormen, 2009, Introduction to Algorithms, The MIT Press; third edition.
- Michael L. Scott. 2015. Programming Language Pragmatics. Morgan Kaufmann, 3rd Edition

**Supplemental Reading: (author, date, title, publisher)**

- Supplemental materials will be provided in class and online.

<b>Version No:</b>		<b>Amended By</b>	
<b>Commencement Date</b>		<b>Associated Programme Codes</b>	

# 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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