Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level (CPD)#
CMPU 2004	CMPU 1010				10	6
Module Title	Computing Fundamentals 2					

Computing Fundamentals 2

School Responsible:	School of Computing

Module Overview:

This module builds on the first year module Computing Fundamentals 1. It covers further theoretical aspects of computer science which are necessary to support and enhance other modules on the course. The topics include statistics, graphs, lattices, and algebras. In particular the topics covered on this module are required in software engineering, programming, cryptography, knowledge representation, and algorithms. The material is presented using languages and software that emphasise the computer science aspects of discrete mathematics.

The aim of this module is to provide the student with the mathematical foundations of computer science which will enable the student to understand the theoretical basis of other modules on the course (e.g. relational databases).

Learning Outcomes (LO):	
On Completion of this module, the learner will be able to	
1	Demonstrate a knowledge of the application of discrete mathematics to computing problems.
2	Identify foundational issues when they are encountered in other course modules.
3	Apply fundamental theory to other course modules.
4	Use the course content to solve computing problems
5	Use the module software on a variety of computing problems

Indicative Syllabus:

- Graph Theory: Definition, properties, graph representation, types, paths, cycles, isomorphism of graphs, planar graph, trees, application of graphs to computing.
- Statistics: range, mode, median, mean, standard deviation, variance, sampling and sampling distributions, probability, hypothesis testing, applications of statistics (e.g. analysis of data stored in a relational database).
- Lattice Theory: lattice notation and definition, relations, closure of relations, ordered sets, partial orders, linear orders, application of lattices to computing (e.g. Formal Concept Analysis FCA).

Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level (CPD)#
CMPU 2004	CMPU 1010				10	6
Module Title	Computing Fundamentals 2					

- Algebraic Structures and Techniques: algebras, theories, models, composition, abstract data types (ADTs), languages for algebraic specification and programming (e.g. Maude, Sage), applications to lists, strings, queues, sacks, trees, etc.
- Supporting software: The above topics will be supported by software tools such as general statistical packages, statistical extensions to SQL, lattice software functional and logic based programming languages.

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
Total Self-Directed Learning Hours	148

Module Delivery Duration:

This module is delivered over one semester

Assessment

Assessment Type	**Weighting (%)**	**LO Assessment (No.)**
Final Exam	70	1-5
Continuous Assessment	30	1-5
Module Specific Assessment Arrangements (if applicable)		
(a) Derogations from General Assessment Regulations		
(b) Module Assessment Thresholds		
(c) Special Repeat Assessment Arrangements		

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

Richard Johnsonbaugh, 2013, Discrete Mathematics, Pearson

Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level (CPD)#
CMPU 2004	CMPU 1010				10	6
Module Title	Computing Fundamentals 2					

Kenneth H. Rosen, 2011, Discrete Mathematics and Its Applications, McGraw-Hill

Supplemental Reading

Edgar G. Goodaire & Michael M. Parmenter,, 2006, Discrete Mathematics with Graph Theory, Pearson.

Feil, Todd, 2003, Essential discrete mathematics for computer science, Prentice Hall

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 ……

Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level (CPD)#
CMPU 2004	CMPU 1010				10	6
Module Title	Computing Fundamentals 2					