

## MODULE DESCRIPTOR

### Module Title

Data Structures and Algorithms

Reference	CM2116	Version	2
Created	September 2023	SCQF Level	SCQF 8
Approved	June 2022	SCQF Points	15
Amended	April 2024	ECTS Points	7.5

### Aims of Module

To provide students with a knowledge of and ability to implement commonly-occurring data structures and abstractions, and the ability to analyse and critically compare algorithms in terms of complexity and efficiency.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Show an extended understanding of different types of commonly occurring data structures and their applications.
- 2 Undertake the design and development of implementations for commonly occurring data abstractions.
- 3 Compute mathematical techniques to critically-compare algorithms based on efficiency and scalability.
- 4 Show an understanding of pseudocode descriptions of methods and algorithms, and implementations thereof.

### Indicative Module Content

Algorithms: sorting and searching, recursive algorithms, algorithm analysis, computational complexity. Data structures: lists, maps, trees, hash tables, stacks, heaps, graphs.

### Module Delivery

The module will be delivered through a mixture of lectures, tutorials and laboratory sessions.

### Indicative Student Workload

	Full Time	Part Time
Contact Hours	30	N/A
Non-Contact Hours	120	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	N/A
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

**ASSESSMENT PLAN**

If a major/minor model is used and box is ticked, % weightings below are indicative only.

**Component 1**

Type: Practical Exam      Weighting: 100%      Outcomes Assessed: 1, 2, 3, 4  
 Description: Practical examination on key concepts in data structures and algorithms.

**MODULE PERFORMANCE DESCRIPTOR****Explanatory Text**

The calculation of the overall grade for this module is based on 100% weighting of C1. An overall minimum grade of D is required to pass this module.

Module Grade	Minimum Requirements to achieve Module Grade:
<b>A</b>	A in Component 1
<b>B</b>	B in Component 1
<b>C</b>	C in Component 1
<b>D</b>	D in Component 1
<b>E</b>	E in Component 1
<b>F</b>	F in Component 1
<b>NS</b>	Non-submission of work by published deadline or non-attendance for examination

**Module Requirements**

Prerequisites for Module	CM1112 Introduction to Programming (or equivalent).
Corequisites for module	None.
Precluded Modules	None.

**INDICATIVE BIBLIOGRAPHY**

- 1 GOODRICH, M.T. and TAMASSIA, R., 2014. Data Structures and Algorithms in Java. 6th Ed. John Wiley.
- 2 LIANG, Y.D., 2017. Introduction to Java Programming and Data Structures. Comprehensive Version. 11th ed. John Wiley.
- 3 STREIB, J.T. and SOMA, T., 2017. Guide to data structures : a concise introduction using Java. Springer.
- 4 CUTAJAR, J., 2018. Beginning Java data structures and algorithms. Packt Publishing.