

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:
A	A in Component 1
B	B in Component 1
C	C in Component 1
D	D in Component 1
E	E in Component 1
F	F in Component 1
NS	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.