# UNIVERSITY OF NORTHAMPTON

# MODULE SPECIFICATION

This document forms the definitive overview as to the nature and scope of this module and is used in the University’s quality assurance processes. The information in this document cannot be changed without approval (except for the Indicative Content).

[A glossary of key terms is available.](https://www.northampton.ac.uk/ilt/current-projects/defining-contact-time/types-of-student-contact-time/)

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| **FACULTY** | Faculty of Art, Science & Technology |
| **SUBJECT AREA** | Technology |
| **SUBJECT FIELD** | Computing |
| **MODULE TITLE** | Data Structures and Algorithms |

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| **MODULE CODE** | CSY2087 |
| **LEVEL** | 5 |
| **CREDIT VALUE** | 20 |
| **MODULE LEADER** | Dr Suraj Ajit |

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| **DELIVERY MODE(S)** | Standard |
| **DELIVERY LOCATION(S)** | UON |

**PRE-REQUISITES\*:**

None

**CO-REQUISITES\*:**

None

**RESTRICTIONS\*:**

None

**SUPPLEMENTARY REGULATIONS**\*:

This module has no supplementary regulations.

**MODULE OVERVIEW:**

This moduleprovides students with a conceptual understanding of common data structures and algorithms used in Computer Science and Software Engineering. It enables students to implement and evaluate a selection of algorithms and abstract data types, including linked lists, stacks, queues, graphs and binary trees using an object-oriented language.

**INDICATIVE CONTENT:**

* Fundamentals of a new programming language: control structures, loops, strings, random numbers, functions, arrays, recursion, enumerated data types
* OOP concepts:Encapsulation, Inheritance and Polymorphism
* Static and Dynamic memory Allocation
* Expression Evaluation, Files, Exceptions, Templates, Vectors
* Searching and Sorting Algorithms including linear search, binary search, bubble sort, selection sort, insertion sort, quick sort, merge sort
* Computational Complexity of Algorithms – Big O notation
* Linked lists, stacks, queues, graphs, binary trees.

**LEARNING OUTCOMES:**

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| **Module Learning Outcome** |
| **On successful completion of the module with guidance students will be able to:** |
| **Subject-Specific Knowledge, Understanding & Application** |
| 1. analyse, design, and implement algorithms in an object-oriented language; |
| 1. apply templates for generic classes and functions |
| 1. evaluate appropriate searching and sorting algorithms |
| 1. implement data structures such as linked lists, stacks, queues and binary trees. |
| **Changemaker & Employability Skills** |
| 1. identify problems and select clearly defined/accepted problem solving strategies for a proposed solution. |
| 1. implement solution to a complex problem individually. |

**TYPICAL LEARNING, TEACHING AND ASSESSMENT HOURS (for the module as delivered on-site at the University of Northampton):**

[View this table on how learning, teaching and assessment hours map to the KIS Categories.](https://www.northampton.ac.uk/ilt/current-projects/defining-contact-time/kis-guidance/)

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| **Learning and teaching information for this module when delivered off-site by UN partners is available from the partner institution’s NILE site (or equivalent). Any variation in study hours must be approved by the University of Northampton before students are enrolled, ensuring that study hours provision is always appropriate to support student achievement of the module learning outcomes.** | |
| **Learning, Teaching and Assessment activities** | **Study hours** |
| **Contact hours: (total)**  Comprising face-to-face and online contact hours as follows: | **48** |
| * **Face-to-face (total)** this may include the following:   F2F (broadcast) lectures  Specialist space (e.g. laboratories, studio space) | 34 |
| * **Online contact hours** **(total)**  (comprising online activities with mediated tutor input) | 14 |
| **Guided independent study hours  (including hours for assessment preparation)** | **152** |
| **Module Total** | **200** |

**ALIGNMENT OF LEARNING OUTCOMES AND ASSESSMENTS:**

**University of Northampton:**

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| **Assessment Activity** | | | **Learning Outcomes** | **Weighting (%)** |
| **Code** | **Assessment Type** | **Assessment Deliverables** |  |  |
| TC1 | Time-constrained assessment | Test  2 hours | a,b,c,e,f | 50 |
| TC2 | Time-constrained assessment | Test  2 hours | d, e, f | 50 |

The assessment items listed above are graded and contribute to the overall module grade (assessment *of* learning).

**APPROVAL/ REVIEW DATES:**

**Version: 1 (was CSY2006)**

Date of approval: