

Liverpool John Moores University

Title: Data Structures and Algorithms
Status: Definitive
Code: **5300ELE** (121429)
Version Start Date: 01-08-2019

Owning School/Faculty: Electronics and Electrical Engineering
Teaching School/Faculty: Electronics and Electrical Engineering

Team	Leader
Paul Otterson	Y

Academic Level: FHEQ5 **Credit Value:** 20 **Total Delivered Hours:** 74
Total Learning Hours: 200 **Private Study:** 126

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	24
Practical	48

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Exam	50	2
Report	Report 1	Application of Data Structures	50	

Aims

*Examine the data structures used in modern computer applications
Understand the algorithms that efficiently use those data structures*

Learning Outcomes

After completing the module the student should be able to:

- 1 Justify the selection of the most appropriate data structure for a particular problem
- 2 Discuss and exemplify a number of important computer algorithms and data structures
- 3 Explain how to evaluate an algorithm for efficiency
- 4 Use data structures and apply algorithms to solve a complex problem

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Exam	2	4	
Application of data structures	1	3	4

Outline Syllabus

Database Tables, Normalization, Indexes

Data Structures (Structs), Pointers, List, Stack, Queue, Tree, Hash Table.

Sorting, Bubble Sort, Selection Sort, Insertion Sort, Shellsort, MergeSort, QuickSort, Bucket Sort, Radix sort

Searching, Sequential Search, Binary Search, Binary Search Tree.

Tree traversal, Breadth/Depth first search

Graphs, edges and vertices, Adjacency list and matrix, Shortest path, Dijkstra's algorithm.

Minimum spanning tree, Prim's and Kruskal's Algorithms.

Critical Path Analysis.

Learning Activities

Lecture, demonstration and practical activities applying topics discussed.

Notes

This module introduces the importance of the use of relevant data structures and algorithms in program design.