

Liverpool John Moores University

Title: DATA STRUCTURES AND ALGORITHMS
Status: Definitive
Code: **5067COMP** (119638)
Version Start Date: 01-08-2019

Owning School/Faculty: Computer Science
Teaching School/Faculty: Computer Science

Team	Leader
Hoshang Kolivand	Y
David Lamb	

Academic Level: FHEQ5 **Credit Value:** 24 **Total Delivered Hours:** 74
Total Learning Hours: 240 **Private Study:** 166

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Practical	24
Tutorial	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Individual Algorithm Implementation task	50	
Exam	AS2	Examination	50	2

Aims

-Introduce a wide range of basic but important computer science concepts used in software development.

-Gain an understanding of how to select and design data structures and algorithms to solve software engineering problems.

- Develop an appreciation of practical industrial applications of expert systems, constraint satisfaction and simulation.
- Enhance the student's programming skills through practical implementation of theoretical ideas covered in the module.

Learning Outcomes

After completing the module the student should be able to:

- 1 Explain and implement algorithms and data structures for efficient problem solving.
- 2 Design and analyse the performance of algorithms applied to different data structures.
- 3 Apply various computational techniques to solve many common problems.
- 4 Understand how typical computational problems can be solved efficiently on a computer.

Learning Outcomes of Assessments

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

Algorithm Implementation	3	4
Examination	1	2

Outline Syllabus

Introduction of data structures
Brief review/revision of Java
Algorithm analysis
Arrays
Recursion
Linked Lists
Stacks
Queues
Trees
Tables (Hashing)
Sorting
Searching
Complexity and NP completeness
Autonomous systems
Constraint satisfaction
Planning.
Scheduling.
Expert systems and production rule systems
Use of simulation

Learning Activities

Lectures, tutorial activities and computer lab practical sessions.

Notes

This module is intended to provide the basis for the design and analysis of algorithms. The emphasis is on solving computational problems that involve manipulating collections of data. A basic set of data abstractions, data structures, and algorithms, which provide a foundation for writing efficient programs, will be introduced and analysed. In the second half of this module these concepts will be utilized in solving various problems in a real world or industrial context. This will involve constraint satisfaction problems, the use of Expert Systems and other software solutions that are appropriate in an industrial process setting.