

Summary Information

Module Code	3100CIT
Formal Module Title	Algorithms and Computing
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 3
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Changshu Institute of Technology

Learning Methods

Learning Method Type	Hours
Lecture	48
Practical	16

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-PAR	PAR	January	12 Weeks

Aims and Outcomes

Aims	This module aims to provide students with an introduction to technical computing and the application of computers in the implementation of simple algorithms. This is supported by a syllabus which covers the key elements of decision mathematics.- To introduce the student to the area of computer systems.- To provide an understanding of the underlying computing platform (hardware, OS, network) upon which applications are developed and hosted.- To introduce students the key elements of decision mathematics and simple algorithms.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Identify the main components of standard computer hardware architectures, the role of an operating system, the file system, networking and standard hardware interfaces.
MLO2	2	Describe the fundamental principles of software, and understand the loading and execution process of the software.
MLO3	3	Understand the basic concepts of the algorithm, and know some typical algorithms.
MLO4	4	Understand the basic concepts of the data structure, and know some typical data structures.

Module Content

Outline Syllabus	1. Module Overview and Introduction to Computing• Introduction to Computer Architecture• CPU Architecture and Multi-core CPUs• Digital Communication - Buses• Digital Communication - Networking2. Fundamental principles of software• Software - Loading and Execution• Software - Multi-programming3. Algorithm overview• Basic concepts of algorithm, data structure and program• Algorithm complexity analysis4. Lists, Stacks and Queues• Abstract Data Types (ADTs)• The List ADT• The Stack ADT• The Queue ADT• Applications5. Trees• Preliminaries• Binary Trees• Tree Traversals • The Search Tree ADT: Binary Search Trees• Applications6. Graph Algorithms• Definitions• Representation of Graphs• Graph Traversals: Depth-First Search and Breadth-First Search Algorithm• Topological Sort• Shortest-Path Algorithms: Dijkstra's Algorithm and Floyd Algorithm• Minimum Spanning Tree: Prim's Algorithm and Kruskal's Algorithm• Applications7. Hashing• General Idea• Hash Function• Separate Chaining• Open Addressing• Rehashing• Applications8. Sorting Algorithm• Preliminaries• Insertion Sort: Straight Insertion Sort, Binary Insertion Sort, Shellsort• Exchange Sort: Bubble Sort, Quicksort• Selection Sort: Simple Selection Sort, Heapsort• Mergesort• Applications
Module Overview	
Additional Information	The modules introduces students the basic theory of algorithm and its application to electronics.Reports are 2000 words maximum word count.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Technology	Programming	100	0	MLO1, MLO2, MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Clifford Mayhew	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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