

Liverpool John Moores University

Title: FOUNDATIONS OF COMPUTER SCIENCE
Status: Definitive
Code: **5072COMP** (120643)
Version Start Date: 01-08-2016
Owning School/Faculty: Computer Science
Teaching School/Faculty: Computer Science

Team	Leader
Somasundaram Ravindran	Y

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
Seminar	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	50	2
Portfolio	AS2	Computer Modelling Tasks	50	

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.

To enhance students problem solving skills through the use of computer science techniques including formal principles of modelling, enabling students to apply these

techniques in the analysis and design of systems.

Learning Outcomes

After completing the module the student should be able to:

- 1 Design and explain algorithms and data structures for efficient problem solving.
- 2 Analyse the performance of algorithms applied to different data structures.
- 3 Use concepts from discrete mathematics to model aspects of computing systems.
- 4 Apply the established notations of sets, functions, relations, trees and graphs to computing examples.

Learning Outcomes of Assessments

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

Examination	1	2
Modelling	3	4

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

Use of simulation

Propositions and predicates, logical connectives, truth tables

Concepts of set theory, set membership, union, intersection and difference

Cartesian products; coordinate systems; vectors and matrices

Functions and their properties; composition. Recursive definitions

Functions of discrete and continuous variables

Relations, inverse relations, composition.

Trees and graphs

Learning Activities

Learning activities will be through lectures and tutorials where students will be encouraged to ask questions and discuss case studies and supported labs where

students will be encouraged to put theory gained in lectures and tutorials into practice.

Notes

This module is intended to provide a strong computer science underpinning. In particular there is an emphasis on how algorithms, data abstraction/structures and their associated programming techniques are used to embed complex functionality in software systems. The second half of the module complements the first by engaging the student with modelling and analysis techniques that are used to investigate and understand computing problems. Taken together these two aspects of computer science develop a scientific and engineering ethos in the student that will help them to think formally.