Liverpool John Moores University

Title:	COMPUTER SCIENCE FOR SECURITY
Status:	Definitive
Code:	**5069COMP** (119651)
Version Start Date:	01-08-2016
Owning School/Faculty:	Computer Science
Teaching School/Faculty:	Computer Science

Team	Leader
David Lamb	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
Tutorial	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
Computer 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

Lectures, tutorial activities and computer lab practical sessions.

Notes

This module is intended to provide a strong computer science underpinning for the study of cyber security problems. 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 about cyber security threats, vulnerabilities and attacks.