Module Specification

Foundations of Computing

Version: 2023-24, v3.0, 16 Jan 2023

Contents

Part 1: Information

Module title: Foundations of Computing

Module code: UFCFFS-30-1

Level: Level 4

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

College: College of Arts, Technology and Environment

School: CATE School of Computing and Creative Technologies

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module introduces the basic programming concepts, techniques, and fundamental problem solving and software development principles.

Features: Not applicable

Educational aims: This module aims to equip students with the fundamental ideas, logic and mathematical concepts upon which computer science is built.

Outline syllabus: Mathematical Structures: Numbers. Sets. Functions. Relations Graphs. Matrices. Application of mathematical structure to computing. Enumerating (counting) these structures

Logic: Propositional logic. Truth tables for basic logic operators. Inference methods. Design of digital circuits

Computation models: Finite Machines; Pushdown Automata; Turing Machines. How these abstract machines work. What limitations they have. How to apply them to real world applications.

Formal Languages: words, sentences, languages, grammars, productions. Links to computing models. How to formally define languages. How a compiler detects syntax errors.

Algorithms: Classes of algorithms, search algorithms and sorting algorithms. Time and space complexity of algorithms. NP-complete problems.

Recursion: Inductive definitions and recursive programs.

Finding and using information resources.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled learning This module will be delivered by a series of lectures accompanied by tutorials. The tutorials will use the course handouts as the basis of discussions of issues presented in the lectures. Students are also expected to begin to identify their own information sources and are supported in this by the UWE library workbook.

Independent learning
Students are expected to work outside scheduled classes on practice, assignment work and directed and semi-directed reading.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Apply an understanding of numbers, sets, functions, relations and propositional logic to real life problems.

MO2 Design and simulate simple digital circuits

MO3 Design and simulate abstract computation models

MO4 Define the syntax of formal languages in terms of productions in order to understand how compilers work

MO5 Define functions using recursion and explain algorithmic behaviour of programs in appropriate formal terms and Big-O notation.

MO6 Extract general principles from studying particular problems and solutions and the application of research.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/lists/DD9641ED-91B9-4A88-DAFF-51C9E8B7EC91.html?lang=en-GB&login=1

Part 4: Assessment

Assessment strategy: The assessment strategy for this module is designed to scaffold the students' confidence and to introduce them to UWE assessment processes.

The coursework consists of a set of portfolio tasks spread out evenly throughout the

year. The first task is an online test. The work is automatically marked and therefore gives the students instant feedback. After this introduction to assessment students will complete a library workbook. Finally, some problem-solving tasks will be given, which are written work. All tasks will be supported in tutorials.

In summary, the coursework has three different types:

A library workbook which helps the student to be confident in some of the key skills that they need to be successful in their studies.

Online tests – for mathematical questions with a short and unique answer. This short answer format is designed to give students the confidence to answer questions for which they will get very rapid feedback.

Written-assessment – for other types of tasks which cannot be marked automatically and require a certain amount of information resource identification.

The similar assessment strategy is also used if a student needs to resit the module.

Assessment tasks:

Written Assignment (First Sit)
Description: A combination of tasks related to mathematics and problems of computational theory
Weighting: 100 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Written Assignment (Resit)
Description: A combination of tasks related to mathematics and problems of computational theory
Weighting: 100 %
Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Science [Phenikaa] BSc (Hons) 2023-24

Computer Science (Artificial Intelligence) [NepalBrit] BSc (Hons) 2023-24

Computer Science [Frenchay] BSc (Hons) 2023-24

Computer Science [Villa] BSc (Hons) 2023-24

Software Engineering for Business [Frenchay] BSc (Hons) 2023-24

Computing {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running BSc (Hons) 2022-23

Computing {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2022-23

Computer Science {Foundation} [Frenchay] BSc (Hons) 2022-23

Computer Science {Foundation} [GCET] BSc (Hons) 2022-23

Computer Science (Smart Devices) {Foundation} [GCET] BSc (Hons) 2022-23

Computer Science (Artificial Intelligence) {Foundation} [GCET] BSc (Hons) 2022-23

Software Engineering for Business {Foundation} [Frenchay] BSc (Hons) 2022-23