Module Specification

Computational Thinking and Practice

Version: 2023-24, v2.0, 03 Jan 2023

Contents

Part 1: Information

Module title: Computational Thinking and Practice

Module code: UFCFQN-30-0

Level: Level 3

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Delivery locations: Not in use for Modules

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: Not applicable

Features: Not applicable

Educational aims: In this module, you will acquire the skills necessary for identifying and modelling a problem into a computational solution. You will then

practice on how to transform a computational solution into a computing program using a programming language.

Outline syllabus: The module will cover:

What is computational thinking: abstract thinking, algorithmic thinking, logical thinking, scalable thinking

Computational thinking for everyone and everywhere

Process of problem solving:
Formulating a problem that could be solved through computation;
Logically organizing and analysing data;
Representing data through models and simulations;
Generalizing to a wide variety of problems;
Searching for the most efficient and effective solution.

Design and implement software through algorithmic thinking:
Approaches and methods for eliciting what is required for programming;
Design techniques;
Programming language constructs and data types;
Strategy, methods and techniques for developing testing.

Part 3: Teaching and learning methods

Teaching and learning methods: The module will be delivered via a combination of lectorial/workshop and lab sessions, with face-to-face and online help provided by tutors.

The module will focus upon computational thinking and software based solution for problem solving.

For the computational thinking part, there is an emphasis on individual reflection,

peer-discussions and collaborations to re-enforce each student's understanding. In the lectorial/workshop sessions, students will be working both individually and in groups on the tasks set by the tutors. Students will be given opportunities to share their insights with the rest of the class. The assessment for this part will be individual assessment and supported by work that is introduced during the module when the students will work on problem(s) taken from their own experience or introduced by module team. For example, they might be asked to consider algorithmic aspects of the provision of catering at the University or transport services or allocating resources to student societies.

For the software solution or programming part, the learning is more focused on developing the individual student's ability to design and program.

In the workshop/lab sessions, students will use their computational thinking skills to derive solutions and to implement the solutions using a programming language.

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

MO1 Formulate and model problems in various task domains, identifying significant features and how to apply an appropriate strategy to finding solutions.

MO2 Translate solution to a problem into a computable form, and evaluate its effectiveness.

MO3 Explore methods to represent solutions as a formal process, such as instructions, algorithms or pseudocode.

MO4 Develop and evaluate ways of representing solutions as code, using basic programming constructs, data types and test methods.

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://uwe.rl.talis.com/modules/ufcfqn-30-0.html

Part 4: Assessment

Assessment strategy: There will be one assessment task: a portfolio;

The assessment regime has been designed to ensure that students' understanding and skills are developed incrementally in a supported way, and that the students' experience is developed in a social and collaborative atmosphere, in accordance with the programme aims.

The portfolio will consist of a report that will document the outputs from individual tasks of problem identification, analysis, modelling, solution design, algorithm, coding and evaluation. The output must address how they have formulated and modelled problems, and what strategies were applied to derive the solution. They will also be asked to write algorithm or program their solution.
Students will be able to get formative verbal feedback during workshops and summative written feedback will be provided once the portfolio is submitted. The formative feedback will help students focus upon more relevant issues in the problem domain to design the solution as part of the portfolio.

For resit of the task, students will have to work on a related problem domain and it will be covering same computational thinking and programming concepts and LOs tested in the main sit component.

Assessment components:

Portfolio (First Sit)
Description: Portfolio of individual problem solving outcomes
Weighting: 100 %
Final assessment: Yes

Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Portfolio (Resit)
Description: Portfolio of individual problem solving outcomes
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Science {Foundation} [GCET] DipHE 2023-24

Games Technology {Foundation} [Frenchay] BSc (Hons) 2023-24

Computer Science (Artificial Intelligence) {Foundation} [GCET] BSc (Hons) 2023-24

Business Computing {Foundation} [GCET] BSc (Hons) 2023-24

Computer Science (Smart Devices) {Foundation} [GCET] BSc (Hons) 2023-24

Computer Science (Artificial Intelligence) {Foundation} [GCET] DipHE 2023-24

Computer Science {Foundation} [GCET] BSc (Hons) 2023-24

Business Computing {Foundation} [GCET] DipHE 2023-24

Computer Science (Smart Devices) {Foundation} [GCET] DipHE 2023-24

Computer Security and Forensics {Foundation} [GCET] BSc (Hons) 2023-24

Computer Security and Forensics {Foundation} [GCET] DipHE 2023-24

Cyber Security and Digital Forensics {Foundation} [Frenchay] BSc (Hons) 2023-24

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

Digital Media {Foundation} [Frenchay] BSc (Hons) 2023-24

Business Computing {Foundation} [Frenchay] BSc (Hons) 2023-24

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