Module Specification

Advanced Algorithms

Version: 2028-29, v1.0, Approved

Contents

Module Specification 1

Part 1: Information 2

Part 2: Description 2

Part 3: Teaching and learning methods 3

Part 4: Assessment 4

Part 5: Contributes towards 5

Part 1: Information

Module title: Advanced Algorithms

Module code: UFCEU5-15-3

Level: Level 6

For implementation from: 2028-29

UWE credit rating: 15

ECTS credit rating: 7.5

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 will cover theoretical advantages and constraints of a broad range of algorithms. Emphasis will be placed in using algorithms that require the processing of data stored in simple or complex structures and one that ranges in volume from simple office applications to Big Data required for the solution of advanced problems. Emphasis will also be placed in designing and implementing algorithms that address the issue of data safety during processing. All algorithms will be considered as to the efficiency of their design.

Features: Not applicable

Educational aims: The aim of this module is to guide students at developing a thorough knowledge of algorithmic techniques which they can apply to real-world problems.

Outline syllabus: Topics are likely to include but are not limited to String Algorithms; Divide-and-Conquer Algorithms; Dynamic Programming; Linear Programming; Simplex algorithm; Network Flow Problems; Algorithms for NP problems; Approximation Algorithms; Parallel Algorithms; Streaming Algorithms; Randomised Algorithms

Part 3: Teaching and learning methods

Teaching and learning methods: The module will be taught through a collection of lectures and practical sessions in the computer laboratory.
On a few occasions parts of the lectures or the practical sessions will be used for reflection on recent topics taught and their impact on the practical work the students will be doing at the time. This will help with improving the blending of the underpinning theory and the application exercises that students will be doing in the laboratory.
Formative feedback will be provided on practical work and will be complementing all other teaching input.

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

MO1 Compare and contrast the distinctive features of a broad range of algorithmic techniques that can be used to solve real-world problems, including those involving Big Data.

MO2 Formulate problems as abstract models which can be solved by generic algorithms and mathematical methods.

MO3 Implement and critically evaluate algorithm design and efficiency in a range of data-processing problems and demonstrate competence in programming.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

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/ufceu5-15-3.html

Part 4: Assessment

Assessment strategy: The module will be assessed through a single portfolio assignment to enable students to demonstrate a broad range of advanced algorithmic techniques, apply knowledge and skills in depth to solve real-world problems, and implement their critically evaluated algorithm design in programming.

The portfolio may include multiple components such as written report to demonstrate analysis and evaluation of chosen solutions, coding project to evidence practical implementation skills and recorded video to present and explain the implemented solutions. In short, students are required to select, design, and implement algorithms that deliver efficient and effective solutions to the assigned problems.
Students will be required to reflect on the quality of their practical work using the criteria introduced during lecture sessions. It is recommended that students spend, on average, 20 hours completing all elements of the portfolio.

Referral work will follow the same format as the main assessment.

Assessment tasks:

Portfolio (First Sit)
Description: Portfolio (max 3 items)
Weighting: 100 %
Final assessment: Yes

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

Portfolio (Resit)
Description: Portfolio (max 3 items)
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Science [Frenchay] BSc (Hons) 2026-27

Computer Science {Foundation} [Frenchay] BSc (Hons) 2025-26

Computer Science [Villa] BSc (Hons) 2026-27

Computer Science {with International Year One} [UWEBIC] BSc (Hons) 2026-27