Module Specification

Advanced Algorithms

Version: 2021-22, v3.0, 13 Sep 2021

Contents

Part 1: Information

Module title: Advanced Algorithms

Module code: UFCFYR-15-2

Level: Level 5

For implementation from: 2021-22

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Delivery locations: Frenchay Campus

Field: Computer Science and Creative Technologies

Module type: Standard

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: 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:

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 (assessed in component A)

MO2 Formulate problems as abstract models which can be solved by generic algorithms and mathematical methods (assessed in Component A & B)

MO3 Critically evaluate, the effectiveness of the design, efficiency of the applications of algorithms for processing data on a wide range of problems (assessed in Component B)

MO4 Execute and implement algorithms in a programming language, taking into consideration computationally sustainable performance. (assessed in component B)

MO5 Design Algorithms and Implement programs to support data safety in applications (assessed in Component A

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

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/CFCCD1EF-6254-0C4C-0478-5AED9AFB1B7B.html

Part 4: Assessment

Assessment strategy: The assessment for the module will comprise both formative and summative assessment.
Formative assessment will be in the form of a small number of tests made up of exam style questions that students will attempt on their own time. Answers to these questions will be provided online along with supplementary comments as to specific reading that will support such answers.
Practical exercises during laboratory sessions will be part of formative assessment, with feedback provided during the timetabled sessions.

Summative assessment will involve two in-class test by the middle and end of the semester and a practical coursework. The practical coursework will require students

to select, design and implement algorithms to provide efficient and effective solutions to a given problem and a relevant data set that. Students will be required to reflect on the quality of their practical work based on criteria taught during the lecture sessions.
Referral work will be of the same format as the main summative assessment.

Assessment components:

In-class test - Component A (First Sit)
Description: There are two in-class tests happened in the lab sessions by the middle and end of the semester. Each test lasts one hour, and can be extended to 1.5 hour for the students with an adjustment.
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO5

Practical Skills Assessment - Component B (First Sit)
Description: Individual Coursework with demonstration of the work in class. Students will design and implement algorithms to manage data sets given to them. the work will be demonstrated to the practical tutor in the laboratory. They will also critically evaluate their work in terms of efficiency and effectiveness in having addressed the task given to them.
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO3, MO4

Examination - Component A (Resit)
Description: A PC lab exam which will generate an exam PC room booking for the resit
Weighting: 50 %
Final assessment: Yes
Group work: No

Learning outcomes tested: MO1, MO2, MO5

Practical Skills Assessment - Component B (Resit)
Description: Same as main sit. Students will be required to do a demonstration as per the main sit.
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2020-21

Computer Science [Sep][SW][Frenchay][4yrs] BSc (Hons) 2020-21