MODULE SPECIFICATION

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	Field	Computer Science and Creative Technologies
Department	FET Dept of Computer Sci & Creative Tech		
Contributes towards	Computer Science BSc (Hons) 2020-21		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
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. **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

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.

Part 3: Assessment
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 an end of the semester examination 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.

First Sit Components	Final Assessment	Element weighting	Description
Practical Skills Assessment - Component B		50 %	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.
Examination - Component A	✓	50 %	End of semester examination (3 hours)
Resit Components	Final Assessment	Element weighting	Description
Practical Skills Assessment - Component B		50 %	Same as main sit. Students will be required to do a demonstration as per the main sit.
Examination - Component A	✓	50 %	Same as per main sit

Part 4: Teaching and Learning Methods		
Learning Outcomes	On successful completion of this module students will be able to:	
		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 (assessed in component B)
	MO5	Design Algorithms and Implement programs to support data safety in applications (assessed in Component A

Contact Hours	**Contact Hours**	
	Independent Study Hours:	
	Independent study/self-guided study	114
	Total Independent Study Hours:	114
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	36
	Total Scheduled Learning and Teaching Hours:	36
	Hours to be allocated	150
	Allocated Hours	150
Reading List	*The reading list for this module can be accessed via the following link:* https://rl.talis.com/3/uwe/lists/CFCCD1EF-6254-0C4C-0478-5AED9AFB1B7B.html?lang=en-GB&login=1	