Module Descriptor

Title	Structures & Algorithms		
Session	2025/26	**Status**	Published
Code	COMP08034	**SCQF Level**	8
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	Rebecca Redden		

Summary of Module

The module begins with a revision of core programming concepts. There follows an introduction to data and procedural abstraction and their use in specifying characteristics of a data structure and primitive operations are considered. The module further investigates programming concepts by considering abstract data types (ADTs) and the object-oriented principles and uses of encapsulation, classes, inheritance and polymorphism. Abstract data types as interfaces are discussed and explored.

Consideration is given to linear data structures: arrays, linked lists, and their use in the implementation of abstract data types, looking at applications and concepts such as stacks and queues. The module also includes an introduction to binary search trees. Further analysis of algorithms for space and time complexity is covered along with algorithmic design techniques such as divide and conquer, and the treatment of a number of sorting and searching algorithms.

Undertaking this module will develop a range of graduate attributes. The module develops the student's intellectual powers, understanding and independent critical judgement, problem solving and communication skills.

Module Delivery Method	**On-Campus[1]**	**Hybrid[2]**	**Online[3]**	**Work -Based Learning[4]**
	☒	☐	☒	☐

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

Campuses for Module Delivery	☒ Ayr ☒ Dumfries		☒ Lanarkshire ☐ London ☒ Paisley		☒ Online / Distance Learning ☐ Other (specify)	
Terms for Module Delivery	Term 1	☒	Term 2	☒	Term 3	☐
Long-thin Delivery over more than one Term	Term 1 – Term 2	☒	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
L1	Demonstrate an understanding of program design paradigms: structured and object-oriented design and abstract data types (ADTs);
L2	Be able to design, implement and use simple collection classes (or ADTs) as components in a software system using an object-oriented programming language;
L3	Evaluate and select appropriate algorithms for the implementation of the operations of an abstract data type or collection class
L4	N/A
L5	N/A

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	**During completion of this module, there will be an opportunity to achieve core skills in:**
Knowledge and Understanding (K and U)	**SCQF 8** Understanding object-oriented programming design and techniques.Understanding of data abstraction and specification.Understanding of algorithm design.
Practice: Applied Knowledge and Understanding	**SCQF 8** Designing a program while displaying development of data abstraction and algorithmic design.Implementing a program while displaying development of data abstraction and algorithmic design.
Generic Cognitive skills	**SCQF 8** Developing learning awareness of active deep learning necessary to acquire object-oriented programming skills.
Communication, ICT and Numeracy Skills	**SCQF 8** Communicating knowledge effectively.Interpreting problems and stating solutionsMaking effective use of tools and information
Autonomy, Accountability and Working with Others	**SCQF 8** Work on own to gain concepts, identifying their own learning needs.Work as part of a group to implement a program design

Prerequisites	**Module Code** COMP07027	**Module Title** Introduction to Programming
	Other	

Co-requisites	Module Code	Module Title

Learning and Teaching
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours. The module provides a thorough grounding in fundamental concepts of computer programming. A range of learning situations are used from traditional lectures to tutorials and lab work in which the students can apply knowledge and skills to a set of defined tasks.

Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	24
Tutorial / Synchronous Support Activity	12
Laboratory / Practical Demonstration / Workshop	24
Independent Study	140
Please select	
Please select	
TOTAL	200

Indicative Resources
The following materials form essential underpinning for the module content and ultimately for the learning outcomes: Course notes (published on Moodle) David A Watt and Deryck F Brown. Java Collections: An Introduction to Abstract Data Types, Data Structures and Algorithms. John Wiley & Sons, 2001. ISBN 0-471-89978X.. *
(N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements
In line with the Student Attendance and Engagement Procedure, Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time. **For the purposes of this module, academic engagement equates to the following:** The School of Computing, Engineering and Physical Sciences considers attendance and engagement to mean a commitment to attending, and engaging in, timetabled sessions. You will scan your attendance via the scanners each time you are on-campus and you will login to the VLE several times per week. Where you are unable to attend a timetabled learning session due to illness or other circumstance, you should notify the Programme Leader that you cannot attend. Across the School an 80% attendance threshold is set. If you fall below

this, you will be referred to the Student Success Team to see how we can best support your studies.

Equality and Diversity
The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code. Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity for students from all backgrounds and learning needs. Using the VLE, material will be presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on inclusive learning and teaching practice. This module has lab-based teaching and as such you are advised to speak to the Module Co-ordinator to ensure that specialist assistive equipment, support provision and adjustment to assessment practice can be put in place, in accordance with the University's policies and regulations.
(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	**Computing**
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ **Yes** ☒ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
School Assessment Board	Business and Applied Computing
Moderator	TBC
External Examiner	A Jindal
Accreditation Details	This module is accredited by BCS as part of a number of specified programmes. It is also accredited by Skillset as part of BSc (Hons) Computer Games Technology
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	2.06

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
A class test and lab assessment worth 30 percent each of the final mark. A formative class test and assessed lab are provided and feedback is given. The assessments are spread throughout the module.
Assessment 2
Group project worth 40 percent of the final mark.
Assessment 3

(N.B. (i) Assessment Outcomes Grids for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed.

(ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Class test (written)/Clinical/ Fieldwork/ Practical skills assessment/ Debate/ Interview/ Viva voce/ Oral	☒	☒	☐	☐	☐	50	4

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Creative output/ Audiotapes/ Videotapes/ Games/ Simulations/Portfolio of practical work	☐	☒	☒	☐	☐	50	13

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		
Combined total for all components						100%	17 hours

Change Control

What	**When**	**Who**
Attendance and Engagement and Equality and Diversity statements updated	20/1/25	L Smith
Module Coordinator updated	17/03/2025	A Adamson