University of the West of Scotland

Module Descriptor

Title of Module: Structures & Algorithms			
Code: COMP08034	**SCQF Level: 8** **(Scottish Credit and Qualifications Framework)**	**Credit Points: 20**	**ECTS: 10** **(European Credit Transfer Scheme)**
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	Miriam Birch		

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. This module can be delivered in 'long thin' mode.

Module Delivery Method		
Face-To-Face	**Blended**	**Fully Online**
✓		✓

Face-To-Face
Term used to describe the traditional classroom environment where the students and the lecturer meet synchronously in the same room for the whole provision.

Fully Online
Instruction that is solely delivered by web-based or internet-based technologies. This term is used to describe the previously used terms distance learning and e learning.

Blended
A mode of delivery of a module or a programme that involves online and face-to-face delivery of learning, teaching and assessment activities, student support and feedback. A programme may be considered "blended" if it includes a combination of face-to-face, online and blended modules. If an online programme has any compulsory face-to-face and campus elements it must be described as blended with clearly articulated delivery information to manage student expectations

Campus(es) for Module Delivery						
The module will **normally** be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
✓	✓	✓	✓		✓	

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1	✓	Term 2	✓	Term 3	

Learning Outcomes: (maximum of 5 statements)

On successful completion of this module the student will be able to:

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

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 Level 8. Understanding object-oriented programming design and techniques.Understanding of data abstraction and specification.Understanding of algorithm design.
Practice: Applied Knowledge and Understanding	SCQF Level 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 Level 8. Developing learning awareness of active deep learning necessary to acquire object-oriented programming skills.

Communication, ICT and Numeracy Skills	SCQF Level 8. Communicating knowledge effectively.Interpreting problems and stating solutionsMaking effective use of tools and information	
Autonomy, Accountability and Working with others	SCQF Level 8. Work on own to gain concepts, identifying their own learning needs.Work as part of a group to implement a program design	
Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code: COMP07027	**Module Title:** Introduction to Programming
	Other:	or equivalent
Co-requisites	**Module Code:**	**Module Title:**

* Indicates that module descriptor is not published.

Learning and Teaching	
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** (Normally totalling 200 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
	200 Hours Total

**Indicative Resources: (eg. Core text, journals, internet access)
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.. *

Attendance Requirements

In line with the Academic Engagement and Attendance Procedure, Students are defined as academically engaged if they are regularly engaged with timetabled teaching sessions, course-related learning resources including those in the Library and on Moodle, and complete assessments and submit these on time. Please refer to the Academic Engagement and Attendance Procedure at the following link: Academic engagement and attendance procedure

Supplemental Information

Programme Board	Applied Computing
Assessment Results (Pass/Fail)	No
Subject Panel	Business & Applied Computing
Moderator	Glenn Affleck
External Examiner	Alamgir Hossain
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
Changes/Version Number	2.04 Text on graduate attributes added. Assessment grids changed. Have added an extra coursework to 2nd component & changed split between components to 50:50.

Assessment: (also refer to Assessment Outcomes Grids below)

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.

Group project worth 40 percent of the final mark.

(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 Handbook.)

Assessment Outcome Grids (Footnote A.)

Component 1

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Class test (written)	✓			25	1
Clinical/ Fieldwork/ Practical skills assessment/ Debate/ Interview/ Viva voce/ Oral		✓		25	3

Component 2					
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Creative output/ Audiotapes/ Videotapes/ Games/ Simulations			✓	40	10
Portfolio of practical work		✓		10	3
Combined Total For All Components				100%	17 hours

Footnotes
A. Referred to within Assessment Section above
B. Identified in the Learning Outcome Section above

Note(s):

1. More than one assessment method can be used to assess individual learning outcomes.
2. Schools are responsible for determining student contact hours. Please refer to University Policy on contact hours (extract contained within section 10 of the Module Descriptor guidance note). This will normally be variable across Schools, dependent on Programmes &/or Professional requirements.

Equality and Diversity

This module is suitable for all students. When a student discloses a disability, or if a tutor is concerned about a student, the tutor in consultation with the School Enabling Support co-ordinator will agree the appropriate adjustments to be made. In order to complete this module elements of lecture, tutorial and laboratory work will be required to be undertaken for which appropriate support can be undertaken where required.
UWS Equality and Diversity Policy

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)