Ollscoil Teicneolaíochta an Oirdheiscirt
South East Technological University

DATA: Advanced Data Structures and Algorithms

Module Title:	Advanced Data Structures and Algorithms
Language of Instruction:	English

Credits:	5

NFQ Level:	7

Module Delivered In	2 programme(s)

Teaching & Learning Strategies:	The course material will be delivered by laboratory based lectures where learners can use a programming environment to explore data structures as they are introduced. Learners will undertake worksheets on topics and problems discussed in class. Students will also be assigned a project to implement an application related to the material covered. They will be expected to participate in class discussions on the materials covered and describe their methods used to solve problems.

Module Aim:	To develop further the language of computational structures with emphasis on the design and analysis of a range of algorithms.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Design and implement a variety of non-linear structures for storing data and their corresponding algorithms;
LO2	Use recursion in algorithmic implementations;
LO3	Recognise the importance of algorithm complexity along with techniques of Algorithms Design.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
1st year Programming or equivalent. 2nd year Data Structures and Algorithms I

Module Content & Assessment

Indicative Content
Review and Introduction Review basic ADTs with Introduction Dynamic storage
Non-linear Structures and Applications Trees, Balanced trees, Tries, Heaps
Recursion Recursive algorithms and their implementation
Complexity and Design techniques Algorithm complexity, Algorithm Strategies, Analysis of simple algorithms, Design techniques, Advanced Sorting algorithms

Assessment Breakdown	%
Continuous Assessment	20.00%
Project	80.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Class test either online or in-class	1,3	20.00	Week 4

Project

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Individual project to design, implement and code a given application, presented in report format. Involves choosing and designing custom structures and algorithms. Collaboration project with Advanced programming	1,2	50.00	Week 9
Project	Take Home sheet : to solve a set of unseen problems. Some will involve choosing and applying appropriate data structures and algorithms. Others will involve critically choosing, analysing and designing custom data structures and efficient algorithmic solutions.	1,2,3	30.00	Week 12

No Practical

No End of Module Formal Examination

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time

Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	3.00
Laboratory	12 Weeks per Stage	1.00
Tutorial	12 Weeks per Stage	1.00
Estimated Learner Hours	15 Weeks per Stage	4.33
	Total Hours	125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_KCSOF_B	Bachelor of Science (Honours) in Software Development	5	Mandatory
CW_KCSOF_D	Bachelor of Science in Software Development	5	Mandatory