DATA: Data Structures and AI Algorithms

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

Credits:	5

NFQ Level:	7

Module Delivered In	1 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 also be assigned practical exercises which will enable them incorporate fundamental data structures into their general project work. Students will also be assigned a project to implement a shortest path algorithm with visualisation into a game prototype.

Module Aim:	To give the learner an understanding of complex data structures and algorithms and their applications in computer games.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Use data structures and algorithms from an existing professional library
LO2	Design and implement a selection of common data structures and algorithms using object-oriented techniques
LO3	Describe and implement various pathfinding techniques

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.*
No requirements listed

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Module Content & Assessment

Indicative Content
Templates Introduction to templates and core concepts of the Standard Template Library
Common Containers Linked lists; queues; priority queues; maps; hash tables.
Graph theory Directed and undirected graphs; weighted graphs; graph representations; graph traversal algorithms.
Pathfinding Breadth-first search, depth-first search, shortest path algorithms, A* pathfinder.

Assessment Breakdown	%
Project	20.00%
Practical	40.00%
End of Module Formal Examination	40.00%

No Continuous Assessment

Project				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Implementation of shortest-path pathfinding algorithm.	3	20.00	Week 11

Practical				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Participation in and completion of practical work.	1,2,3	40.00	n/a

End of Module Formal Examination				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	90 minute written examination.	1,2,3	40.00	End-of-Semester

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

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	1.00
Laboratory	12 Weeks per Stage	4.00
Estimated Learner Hours	15 Weeks per Stage	4.33
	Total Hours	125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_KCCGD_B	Bachelor of Science (Honours) in Computer Games Development	5	Mandatory