DATA H3205: Data Structures & Algorithms

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

Credits:	10

NFQ Level:	7

Module Delivered In	No Programmes

Teaching & Learning Strategies:	The course material will be delivered by laboratory based lectures where students can use a programming environment to explore data structures as they are introduced. Students will also be assigned practical exercises, upon completion of which they will be able to: develop simple game prototypes to illustrate the application of fundamental data structures; implement a graph API to demonstrate various pathfinding algorithms in a real-time game.

Module Aim:	To give the student 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 complex data structures and algorithms using object oriented techniques
LO3	Describe and implement advanced path finding techniques

Pre-requisite learning		
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*		
6876	PROG H2222	Programming II
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
Data Structures and Algorithms: Collections: iterators; linked lists; queues; priority queues; maps; hash tables. Trees: general trees, binary trees, binary search trees, heaps. Graph theory: directed and undirected graphs; weighted graphs; graph representations; graph traversal algorithms. Pathfinding: Tile-based and non tile-based algorithms; breadth-first search, distance-first pathfinder, heuristic pathfinder, A* pathfinder.

Assessment Breakdown	%
Continuous Assessment	10.00%
Project	20.00%
Practical	20.00%
End of Module Formal Examination	50.00%

Continuous Assessment				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Examination	Class Exam	1,2	10.00	n/a

Project				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Mini Project	2,3	20.00	Sem 1 End

Practical				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Participation in and completion of practical work	1,2,3	20.00	Sem 1 End

End of Module Formal Examination				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	Three hour written exam.	1,2,3	50.00	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*
Laboratory	20 Weeks per Stage	5.00
Estimated Learner Hours	20 Weeks per Stage	4.00
	Total Hours	180.00