

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	
<i>On successful completion of this module the learner should be able to:</i>	
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 <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

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

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
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