Module Title:	Machine Learning for Games
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	1 programme(s)

Teaching & Learning Strategies:	Traditional lectures are used to convey knowledge from teacher to student, and students are actively encouraged to engage in discussion during class. During the practical sessions, students will undertake various laboratory exercises implementing and exploring a variety of algorithms. Group learning is also utilised via a module group project and also a cross-module group project as possible. A term paper will involve a more in-depth study of the topics raised.

Module Aim:	To immerse students in the formal theory, and the application of contemporary techniques in Machine Learning for computer games development.

Learning Outcomes
On successful completion of this module the learner should be able to:

LO1	Demonstrate an excellent understanding of non symbolic approaches to Artificial Intelligence
LO2	Understand, evaluate and communicate the key principles, theories and techniques specific to the training of Machine Learning models.
LO3	Apply key principles, theories and techniques (particularly Machine Learning technologies) with respect to computer games development.

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

Module Content & Assessment

Indicative Content
Introduction to Machine Learning Probability, Inference, Clustering, N-Gram Prediction
Artificial Neural Networks Perceptron, Multilayer Networks, Backpropagation, Simmulated Annealing
Genetic Algorithms Genetic encoding, Genetic Operators, Selection, Mutation, Combining GAs and Neural Networks
Agent Based Systems and Reinforcement Learning ABS concepts, Reinforcement Learning, q-Learning, DQN

Assessment Breakdown	%
Continuous Assessment	30.00%
Project	20.00%
End of Module Formal Examination	50.00%

Continuous Assessment				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Case Studies	Students are required to implement specific algorithms within a gaming context	1,2,3	30.00	n/a

Project				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Intended as a cross-module project	2,3	20.00	n/a

No Practical

End of Module Formal Examination				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	A written assessment of student's understanding and ability to conceptually apply the course material appropriately.	1,2,3	50.00	End-of-Semester

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	2.00
Laboratory	12 Weeks per Stage	2.00
Estimated Learner Hours	15 Weeks per Stage	5.13
	Total Hours	125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_KCCGD_B	Bachelor of Science (Honours) in Computer Games Development	8	Group Elective 1

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