MODULE DESCRIPTOR

Module Title

AI for Games

Reference	CM4137	Version	1
Created	October 2023	SCQF Level	SCQF 10
Approved	August 2017	SCQF Points	15
Amended	July 2022	ECTS Points	7.5

Aims of Module

This module aims to provide advanced insights into the design, implementation, and optimisation of Artificial Intelligence (AI) systems for interactive digital environments. Students will explore cutting-edge techniques in AI with a specific focus on their application in video games. Through theoretical study and practice based learning, students will develop proficiency in creating intelligent, dynamic, and responsive virtual agents, equipping students with the skills necessary to design and implement sophisticated AI-driven gameplay experiences.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1	Develop expertise in implementing AI algorithms tailored for video games, enabling creation of dynamic and responsive virtual agents.
2	Compose strategies to optimise AI computations, ensuring seamless integration within the game environment for a smooth player experience.
3	Conceptualise AI agents that adapt to changing game conditions.
4	Modify various aspects of gameplay, from enemy behaviour to non-player character interactions.
5	Critique AI algorithms, striking a balance between creating challenging gameplay and maintaining player enjoyment.

Indicative Module Content

Foundational AI Concepts; Pathfinding algorithms, decision trees, and behaviour trees, video game environments. Advanced AI; State machines, finite state automata, and reinforcement learning, intelligent and adaptive virtual agents. Real-time Optimisation Techniques; Ensuring AI systems operate seamlessly within a game's interactive framework. Simulation of Human-like Behaviours; Emotion-driven AI and procedural content generation. Ethics; Considerations and responsible AI deployment in games.

Module Delivery

Key concepts are introduced and illustrated through lectures and directed reading. The understanding of students is tested and further enhanced through interactive tutorials. In the laboratories, the student will progress through a sequence of exercises to develop sufficient knowledge and skills in AI, applicable to games.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	30	N/A
Non-Contact Hours	120	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	N/A
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	100%	Outcomes Assessed:	1, 2, 3, 4, 5

Description: A coursework that explored and develops an AI-driven gameplay experience.

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

The calculation of the overall grade for this module is based on 100% weighting of C1. An overall minimum grade of D is required to pass the module.

Module Grade	Minimum Requirements to achieve Module Grade:
A	The student must achieve an A in C1.
B	The student must achieve a B in C1.
C	The student must achieve a C in C1.
D	The student must achieve a D in C1.
E	The student must achieve an E in C1.
F	The student must achieve an F in C1.
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1	Sturtevant, N. R. (2019). Artificial Intelligence for Computer Games: An Introduction. CRC Press.
2	Isla, B., & Togelius, J. (2018). Artificial Intelligence and Games. Springer.
3	Yannakakis, G. N., & Togelius, J. (2018). Artificial Intelligence and Games: A New Approach to Game Design. Springer.
4	Santos, P. (2019). Unity Artificial Intelligence Programming (2nd ed.). Packt Publishing.
5	Hoover, A. K. (2021). Game AI Pro 360: Guide to Tactical Intelligence. CRC Press.