Module specification

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Module Code	COM755
Module Title	Artificial Intelligence for Games
Level	7
Credit value	20
Faculty	FAST
HECoS Code	101020
Cost Code	GACP

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
MSc Computer Game Development	Core
MSc Computer Game Development (with Advanced Practice)	Core

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	21 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**21 hrs**
Placement / work based learning	0 hrs
Guided independent study	179 hrs
Module duration (total hours)	**200 hrs**

For office use only	
Initial approval date	10/05/2023
With effect from date	September 2023

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Date and details of revision	
Version number	1

Module aims

In this module students are given the opportunity to study problem solving techniques that are applicable to artificial intelligence with the intention of providing them with the ability to develop intelligent systems. It will concentrate on areas of AI that are particularly applicable to Computer Games and its relevant digital industries.

Investigating the role of human intelligence from the Computer Science point of view will enable students to appreciate the role of problem solving. Typical techniques include identification trees, neural nets, genetic algorithms, sparse spaces, near misses particularly applicable to nearest neighbours will be studied. These techniques will enable students to tackle problems in the areas of machine learning, pattern recognition, natural language processing and understanding, perception and expert systems.

Module Learning Outcomes - at the end of this module, students will be able to:

1	Critically analyse and assess contemporary artificial intelligence practices and strategies to integrate them to game-based scenarios.
2	Design and implement an artificial intelligence solution into a game-based scenario using contemporary tools and techniques.
3	Critically evaluate results obtained from an artificial intelligence solution.

Assessment

Indicative Assessment Tasks:

Indicatively students will start this module by appraising and assessing contemporary AI practices and strategies. Students will need to research and identify key game AI based talking points relating to wider context of game development and digital technologies.

Students will continue their workflow by designing and implementing and AI system into a game-based scenario. Students will finally be required to evaluate the effectiveness of AI system.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1, 2, 3	Coursework	100%

Derogations

None

Learning and Teaching Strategies

In line with the Active Learning Framework, this module will be blended digitally with both a VLE and online community. Content will be available for students to access synchronously and asynchronously and may indicatively include first and third-party tutorials and videos, supporting files, sections of code/diagrams or any additional content that supports their learning.

As this module progresses, a structured strategy will be used to support the students engaging with the key threshold concepts relating to the learning outcomes. The module will include a balanced mixture of engaging tutor-led lectures, demonstrations, and facilitation. As the module continues experiential and peer learning strategies will be encouraged as the students' progress with their coursework.

Indicative Syllabus Outline

Indicative Syllabus will include:

- Autonomous Agents
- Agents, Knowledge and Data
- Machine Learning
- Pattern Recognition
- Human-Computer Interaction
- Advanced Vision
- Algorithmic Game Theory and Its Applications
- Computer Animation and Visualisation
- Game Engine Tools for AI

Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update. Please *ensure correct referencing format is being followed as per University Harvard Referencing Guidance.*

Essential Reads

Roberts, P. (2022), *Artificial Intelligence in Games*, Boca Raton: CRC Press.

Other indicative reading

Madhav, S. (2018), *Game Programming in C++: Creating 3D Games*, London: Addison-Wesley.

Millington, I. (2020), *AI for Games*, Third Edition, Boca Raton: CRC Press.

Nystrom, R. (2014), *Game Programming Patterns*, New York: Genever Benning.

Russell, S., Norvig, P. (2021), *Artificial Intelligence: A Modern Approach*, Fourth Edition, Cambridge: Pearson Publishing

Sapio, F. (2019), *Hands-On Artificial Intelligence with Unreal Engine: Everything you want to know using Blueprints or C++*, Birmingham: Packt Publishing.

Employability skills – the Glyndŵr Graduate

Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas.

Core Attributes
Engaged
Enterprising
Creative
Ethical

Key Attitudes
Commitment
Curiosity
Resilience
Confidence
Adaptability

Practical Skillsets
Digital Fluency
Organisation
Critical Thinking
Emotional Intelligence
Communication