Module Descriptor

Title	AI Programming for Games		
Session	2025/26	**Status**	Published
Code	COMP09041	**SCQF Level**	9
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	P Keir		

Summary of Module

This module will provide a hands-on introduction to the application of artificial intelligence (AI) methods to real-world problems from the domain of videogames. Students are first introduced to contemporary videogame AI topics, including large-language models; steering; individual and group pathfinding; behaviour trees; and constraint solvers. Classic topics from AI are subsequently covered, including neural networks; computer vision; and game theory. Tutorial and laboratory material is developed in the C++ programming language; alongside the Raylib library for interactive graphics and sound.

This module will work to develop a number of the key 'I am UWS' Graduate Attributes. Of those attributes, this module will focus on making those who complete this module: Universal (Critical Thinker & Research-minded); Work Ready.

(Problem-Solver, Effective Communicator & Digitally Literate); and Successful (Autonomous, Imaginative & Resilient).

Module Delivery Method	**On-Campus[1]**	**Hybrid[2]**	**Online[3]**	**Work -Based Learning[4]**
	☒	☐	☐	☐

Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☐ Lanarkshire ☐ London ☒ Paisley	☐ Online / Distance Learning ☐ Other (specify)

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

Terms for Module Delivery	Term 1	☒	Term 2	☐	Term 3	☐
Long-thin Delivery over more than one Term	Term 1 – Term 2	☐	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
L1	Demonstrate an understanding of current strands in artificial intelligence applied to videogames.
L2	Investigate, via programming, the techniques covered in the course.
L3	Select an appropriate technique for any desired aspect of intelligence
L4	Apply these techniques within software relevant to videogame development
L5	N/A

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	**During completion of this module, there will be an opportunity to achieve core skills in:**
Knowledge and Understanding (K and U)	**SCQF 9** Demonstrate an understanding of the scope and defining features of artificial intelligence within the domain of computer games; along with an integrated knowledge of its main areas and boundaries. Show a critical understanding of a range of the principles, principal theories, concepts and terminology of computer game AI.
Practice: Applied Knowledge and Understanding	**SCQF 9** Apply knowledge in using a range of algorithms, libraries, development tools, and development methodologies associated with the domain of computer games. Apply skills and understanding to techniques, practices and materials that are specialised and advanced.
Generic Cognitive skills	**SCQF 9** Undertake critical analysis, evaluation and synthesis of ideas, concepts, information and issues in solving real-world game AI problems within interactive graphical environments. You will draw on a range of sources in making judgements including contemporary library materials, and online resources.
Communication, ICT and Numeracy Skills	**SCQF 9** Use and develop C++ programming skills while completing laboratory exercises. Develop written communication skills via the submission of a formal report, incorporating graphical results, for set assignments on specific AI problems relevant to videogames.
Autonomy, Accountability and Working with Others	**SCQF 9** Exercise autonomy and initiative in the completion of set assignments for a deadline. Through a group assignment, you will practise in ways that show awareness of your own and others' roles and responsibilities.

Prerequisites	Module Code	Module Title
	Other C++	
Co-requisites	**Module Code**	**Module Title**

Learning and Teaching	
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	24
Laboratory / Practical Demonstration / Workshop	24
Asynchronous Class Activity	50
Independent Study	102
Please select	
Please select	
TOTAL	200

Indicative Resources
The following materials form essential underpinning for the module content and ultimately for the learning outcomes: The following materials form essential underpinning for the module content and ultimately for the learning outcomes: Rabin, S. (2020) Game AI Pro 360: Guide to Movement and Pathfinding: Guide to Movement and Pathfinding, CRC Press Millington, I. (2019) AI for Games (Third Edition), CRC Press Rabin, S. ed. (2013,2015,2017) Game AI Pro (1-3): Collected Wisdom of Game AI Professionals, AK Peters/CRC Press Russell S. and Norvig P. (2016) Artificial Intelligence: A Modern Approach, Pearson
(N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements
In line with the Student Attendance and Engagement Procedure, Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time. **For the purposes of this module, academic engagement equates to the following:**

The School of Computing, Engineering and Physical Sciences considers attendance and engagement to mean a commitment to attending, and engaging in, timetabled sessions. You will scan your attendance via the scanners each time you are on-campus and you will login to the VLE several times per week. Where you are unable to attend a timetabled learning session due to illness or other circumstance, you should notify the Programme Leader that you cannot attend. Across the School an 80% attendance threshold is set. If you fall below this, you will be referred to the Student Success Team to see how we can best support your studies.

Equality and Diversity
The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code. Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity for students from all backgrounds and learning needs. Using the VLE, material will be presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on inclusive learning and teaching practice. This module has lab-based teaching and as such you are advised to speak to the Module Co-ordinator to ensure that specialist assistive equipment, support provision and adjustment to assessment practice can be put in place, in accordance with the University's policies and regulations.
(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	**Computing**
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ **Yes** ☒ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
School Assessment Board	Creative Computing
Moderator	T Hainey
External Examiner	S Arnab
Accreditation Details	This module is accredited by BCS and TIGA as part of a number of specified programmes.
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	2.12

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
Assessment 1 - Coursework provided as a set industry-relevant problem relating to material covered in the first three weeks of the module. The coursework requires the submission of a written report, along with a substantial piece of well-engineered software; created using the course programming language. The coursework is set to be completed in groups. The first coursework is worth 30% of the final overall mark for the module.

Assessment 2
- The second assessment is a coursework provided as a set industry-relevant problem relating to material covered in weeks 5 to 9 of the module. The coursework requires the submission of a written report, along with a substantial piece of well-engineered software; created using the course programming language. The coursework is set to be completed in groups. The second coursework is worth 40% of the final overall mark for the module.
Assessment 3
- The third and final assessment is a closed-book class test, comprised of questions drawn from any topic covered during the module. The class test is worth 30% of the final overall mark for the module.
(N.B. (i) Assessment Outcomes Grids for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Report of practical/ field/ clinical work	☐	☒	☒	☒	☐	30	

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Report of practical/ field/ clinical work	☐	☒	☒	☒	☐	40	

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Class test (practical)	☒	☐	☒	☐	☐	30	1
Combined total for all components						100%	hours

Change Control

What	**When**	**Who**
Attendance and EDI Regulations	20/01/2025	L Cunningham
Added LLM Topic to the introduction; added a recent book to indicative resources; Sylvester Arnab added as new EE.	19/02/2025	P Keir
