COURSE SPECIFICATION DOCUMENT

Academic Department: Science, Innovation & Technology

Programme: BSc Computer Science

FHEQ Level: 5

Course Title: AI for Games

Course Code: COMP 5101

Student Engagement Hours: 160
Timetabled Hours: 45
Guided Learning Hours: 15
Independent Learning Hours: 100

Credits:

16 UK CATS credits
8 ECTS credits
4 US credits

Course Description:

This course introduces students to fundamental AI techniques and their applications in game development. Students will learn to design and implement simple AI-driven behaviours to control non-player characters (NPCs) and create dynamic interactions in 2D game environments. Building upon earlier programming skills, this course offers practical insights into integrating AI logic into games, emphasizing interactivity and engaging gameplay.

Prerequisites:

40 credits, COMP 4101 Introduction to Programming

Aims and Objectives:

This course aims to equip students with essential AI programming skills tailored for game development. By the end of this course, students will have experience implementing and testing simple AI behaviours in 2D games, preparing them for further exploration of AI and game development at higher levels or in industry settings.

Programme Outcomes:

L5 AI, AII, BI, BII, CI, CII, DI, DII

Refer to the detailed programme outcomes in the Programme Specification available at: https://www.richmond.ac.uk/programme-and-course-specifications/

Learning Outcomes:

By the end of this course, successful students should be able to:

1. Use appropriate programming languages and libraries to develop interactive 2D games.

2. Implement basic AI algorithms such as pathfinding, finite state machines, and decision trees within a game context.

3. Program NPCs with simple AI behaviours, enhancing the player experience.

4. Develop and test responsive AI elements that enable NPCs to interact dynamically with their environment.

5. Debug and refine AI behaviours to improve game mechanics and user experience.

Indicative Content:

- Introduction to AI for Games: Fundamentals of game development with AI applications.

- Game AI Basics: Overview of AI in game design and development, covering key AI concepts for simple games.

- Pathfinding Algorithms: Implementing pathfinding algorithms like A* in 2D space to navigate NPCs.

- State Machines and Decision Trees: Using finite state machines and decision trees to model NPC behaviours.

- NPC Movement and Behaviour: Coding NPCs that move, react, and make decisions based on player actions and environmental changes.

- Interactivity and Environmental Reactions: Enabling NPCs to interact with various game elements dynamically.

- Testing and Debugging: Techniques for debugging code and testing AI behaviours.

Assessment:

This course adheres to the University Assessment Norms available at:
https://www.richmond.ac.uk/university-policies/

Teaching Methodology:

This course will be delivered face to face through a combination of lectures and interactive sessions. In addition to classroom activities, there are guided learning elements that are tutor led and arranged through Blackboard. These activities can be asynchronous online sessions, flipped classrooms, set readings with discussion boards or set guest lectures for example. Set activities are monitored by the instructor to ascertain student engagement. Students are encouraged to prepare for class and to play an active part, to raise questions, following-up ideas and interact with a wide range of provided material.

Indicative Text(s):

DaGraça, M. (2017) *Practical Game AI Programming*. Birmnigham: Packt Publishing.

Millington, I. (2020) *AI for Games*, 3rd edition. Florida: CRC Press.

Shiffman, D, (2024) *The Nature of Code*. California: No Starch Press. Available online at: https://natureofcode.com/ (Accessed: November 2024)

Websites:

p5js, a Java Script coding platform. Available at: https://p5js.org/ (Accessed: November 2024)

Change Log for this CSD:

Nature of Change	Date Approved & Approval Body (School or AB)	Change Actioned by Registry Services
First Edition	Nov 2024	