LIVERPOOL JOHN MOORES UNIVERSITY

Advanced 3D Games Development

Module Information

2022.01, Approved

Summary Information

Module Code	6205COMP
Formal Module Title	Advanced 3D Games Development
Owning School	Computer Science and Mathematics
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 6
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Computer Science and Mathematics

Learning Methods

Learning Method Type	Hours
Workshop	44

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

Aims	To compare and contrast architectural approaches to building a game engine architecture. To compare and contrast Narratology vs Ludology approaches to game specification.To gain an understanding and implementation experience of advanced game programming methods and techniques, especially in terms of game engines and 3D graphics.To understand how game engine design and architectures can be applied to the Games Software Development Lifecycle to formulate, plan and manage the development of a Vertical Slice Prototype.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Formulate Technical and Game Design Specifications using Ludology for Mechanics, Challenges and Internal Economies.
MLO2	2	Synthesize the technical design into a Vertical Slice Prototype using the modular architecture and associated toolset of a modern game's engine.
MLO3	3	Employ Agile Software Development methodologies to realise the prototype game software.
MLO4	4	Evaluate the fundamental techniques of a specific games' domain and their application to a complex mechanic using appropriate game engine modules.

Module Content

Outline Syllabus	Structures of Modern Game EnginesGames Development EcosystemImplementation of Core Game Loop and Graphics Pipeline into a Game EngineAgile Development and Reuse Oriented DevelopmentLudology vs NarratologyLudic Games Development PrinciplesAgile Development Approaches and Functional Specification TechniquesTechnical Design Documentation and associated UML and CASE ToolsData-Driven Games DevelopmentAsset Conditioning and Data IntegrationRuntime vs Offline Processing and Associated ToolsetsAdvanced Object-Oriented Design ConceptsAdvanced Industry Standard Language concepts for Games ProgrammingLow-level game hardware architectures.Hardware-focused programming techniques.Game Object Model Frameworks and Related Language ConstructsEmergent vs Scripted Behaviours.Scripting for Gameplay and Game Object ModelsCollisions, Materials, Interaction Models.Fundamentals of Non-Playable Character interactions.Animation and Kinematic Motion in Games.Testing, Debugging and Profiling a Games Engine.Spatial Design of Game Levels via Meshing and Constructive Solid GeometryLogical Design of Game LevelsCPU->GPU Architectural Concerns and CPU->GPU Data ExchangeKey Data Exchange (e.g. Transforms and Scene Information)Optimisation Techniques
Module Overview	This module will cover the software engineering principles used to implement a full-scale game engine in order to build complex, large-scale 3D games (commonly termed Triple-A games in the games industry). You will focus on the core modules of a modern engine, as well as its gameplay framework, alongside the game play foundations of the games which are built on top of the engine.
Additional Information	This module will cover the software engineering principles used to implement a full-scale game engine in order to build complex, large-scale 3D games (commonly termed Triple-A games in the games industry).We will focus on the core modules of a modern engine, as well as its gameplay framework. We will explore the game play foundations of the games which are built on top the engine. We will look at various architectural design strategies and provide in-depth coverage of various core modules within a game engine and how they relate to the other domain of study computer games development students have covered. This involves studying advanced programming techniques, use of Scripting Languages and Engine Toolsets and practically applying them in order to construct an advanced 3D game on top of a game engine. Students will apply the concepts of Ludology and formal software specification, to design, develop and deploy a Vertical Slice prototype to a modern gaming platform via a Triple-A (AAA) games engine.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Prototype development	100	0	MLO1, MLO2, MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Christopher Carter	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings