LIVERPOOL JOHN MOORES UNIVERSITY

Advanced Software Engineering for Games

Module Information

2022.01, Approved

Summary Information

Module Code	7118COMP
Formal Module Title	Advanced Software Engineering for Games
Owning School	Computer Science and Mathematics
Career	Postgraduate Taught
Credits	20
Academic level	FHEQ Level 7
Grading Schema	50

Teaching Responsibility

LJMU Schools involved in Delivery
Computer Science and Mathematics

Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	33

Module Offering(s)

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

Aims and Outcomes

Aims	To apply the object oriented and data oriented paradigms in a toolset development environment and how data-driven architectures can be used for localisation, internationalisation and product lifecycle extension. To appraise different software development methodologies and the impact that a specific methodology has on the development paradigm and development process used. To develop advanced programming skills using techniques such as templates, design patterns, GPGPU and parallel programmingTo leverage game technologies in combination with traditional UI-driven programming for use in alternative domains such as simulation, data visualisation and business application development and tools production.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Appraise software engineering methodologies and tools in the context of an iterative development approach.
MLO2	2	Implement advanced software engineering, game programming and general development techniques for game engine toolsets.
MLO3	3	Critically evaluate advanced software development tools and methodologies.

Module Content

Outline Syllabus	Advanced Data Structures and Algorithms: - Custom Collections and IteratorsData Driven Games Development and Data Oriented Programming- Programming as Data Transforms.GPGPU Programming- Using GPGPU for Parallelisation of Game Techniques- Generalising GPU Programming:- Compute - OpenCL/CudaSoftware Engineering Methodologies for Game Programming- Agile, RAD, LEAN, etc. - Mobile Games Development – Managed vs Native ProgrammingAdvanced Object Oriented Programming- Dependency Injection / Inversion of Control- Advanced Abstraction Techniques.Game Design Patterns- Gang of Four – Command, State, Singleton, Observer, Flyweight- Sequencing Patterns- Behavioural Patterns- Decoupling Patterns- Optimisation PatternsParallel vs Sequential Programming Techniques in C++- AMP- Loop Unrolling / Vectorisation- Threading, Mutex, LocksDeveloping Tools using Accelerated Render Targets and UI Frameworks.Applying Game Technologies to simulation and data visualisation.Game Technologies for Information Systems.Localisation and Testing.QA and Internationalisation.Source Control Management and Project Management. Data Driven Architectures for Support SystemsAccelerated Graphics in a Web Environment.Game Editor Architecture and Platform Integration.
Module Overview	
Additional Information	In this module, students will be exposed to the wider fields of development in the games industry, outside of core game programming. Students will develop advanced software engineering skills using programming strategies such as design patterns, optimised data structures, data-oriented programming paradigm and GPGPU programming. The focus will be on the practical application of these techniques to the wider games industry development ecosystem and how game technologies can be leveraged in domains other than games development. Students will be working in team and learn to build a production tool-chain, which utilises data-driven game development, optimised real-time performance and the utilisation of the GPU for non-graphical tasks. The process of building a toolset will demonstrate the importance of a multi-disciplinary approach to development and how development team members in a specific role collaborate in order to create a coherent ecosystem.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	50	2	MLO1, MLO3

Technology	Prototype advanced 3D game	50	0	MLO1, MLO2

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Abdennour El Rhalibi	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings