Liverpool John Moores University

Title:	CREATIVE VISUALISATION
Status:	Definitive
Code:	**6049COMP** (117461)
Version Start Date:	01-08-2016
Owning School/Faculty:	Computer Science
Teaching School/Faculty:	Computer Science

Team	Leader
Sud Sudirman	Y
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Academic Level:	FHEQ6	**Credit Value:**	24	**Total Delivered Hours:**	72
Total Learning Hours:	240	**Private Study:**	168		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Workshop	48

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Technology	AS1	Creative visualisation of complex data.	50	
Technology	AS2	Visualisation Enhancement through GPU Processing	50	

Aims

To develop a theoretical knowledge of the concepts and techniques required for visualisation of data and information.
To provide an opportunity to design and develop a visualisation solution for a given data domain using appropriate tools, techniques and methods.
To explain the use of visual data and resources within 3D visualisation

environments.
To develop theoretical and practical knowledge of GPU-based processing techniques for 3D visualisation enhancement.

Learning Outcomes

After completing the module the student should be able to:

1	Discuss key concepts and techniques in the field of data and information visualisation.
2	Critically evaluate visualisation designs and recommend necessary improvement.
3	Design and develop effective visualisation solutions for a given problem and data domain.
4	Describe and critically evaluate techniques for visualisation enhancement in real-time 3D environments.
5	Practically apply GPU-based processing for the purpose of visualisation enhancement.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Creative visualisation	1	2	3
Visualisation Enhancement	4	5	

Outline Syllabus

Visualisation: Background, application, importance and technology.
Data & Information Representation: Data type, statistical data, time series data, data format etc.
Principles of Graphic Design: Colour, alignment, balance, consistency, contrast, proximity, gestalt etc.
Type of Visualisation: Data visualisation, information visualisation, concept visualisation, strategy
Visualisation Development: Visualisation design, interaction design, data acquisition, data interpretation (parsing) visualisation development – programming, testing and deployment.
Introduction to Rasterisation for real-time 3D visualisation.
Introduction to 3D Data Representation and Resource Usage.
Introduction to GPU-based Processing.
Introduction to Shader-based GPU Processing (HLSL)
Balancing CPU and GPU-based processing
Modern Visualisation Rendering – Global vs. Local Illumination.
Hardware Texturing and Lighting.
Data Mapping using GPU Processing
GPU Visual Effect Processing
Non-Photo Realistic Rendering.
Post Processing Techniques (Render Targets, Deferred Rendering and Post

Processing FX).
Artistic and Data Driven real-time visualisation development.

Learning Activities

Formal lectures will deliver theoretical concepts, whilst practical computer laboratory-based workshop sessions will be used to introduce specific methods, techniques and tools used in the design and development of a visualisation solution, in both 2D and 3D environments.

Notes

This module teaches students the process of visualisation and information. The goal of data visualisation is to use images and visual cues to improve our understanding of a dataset, drawing on techniques from computer science, mathematics, cognitive and perception science and physics. Students will also learn the importance of GPU based Processing and the creative manipulation of buffers, streams and textures to enhance the visual representation of a 3D visualisation environment.