

Liverpool John Moores University

Title: GRAPHICS AND DATA VISUALISATION
Status: Definitive
Code: **6520CSQR** (127387)
Version Start Date: 01-08-2021

Owning School/Faculty: Computer Science and Mathematics
Teaching School/Faculty: Oryx Universal College WLL

Team	Leader
Hoshang Kolivand	Y

Academic Level: FHEQ6 **Credit Value:** 20 **Total Delivered Hours:** 55
Total Learning Hours: 200 **Private Study:** 145

Delivery Options

Course typically offered: S1, S2 and NS2 (S2 for Jan)

Component	Contact Hours
Lecture	33
Practical	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Investigation and research on visualisation	50	
Artefacts	AS2	Interactive graphical application for data visualisation	50	

Aims

To use computer Graphic techniques to develop data and information visualisation: To introduce the theoretical concepts of graphical display, both 2D and 3D, leading to the practical development of visualisation solutions using relevant tools and techniques.

Learning Outcomes

After completing the module the student should be able to:

- 1 Relate effective communications to efficient real-time visual graphics
- 2 Critically analyse graphics used in interactive data visualisation
- 3 Apply key concepts in graphical representation on display devices
- 4 Evaluate solutions for data and information visualisation

Learning Outcomes of Assessments

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

Visualisation Research	3	4
Application	1	2

Outline Syllabus

Introduction to the application of visualisation and the associated technologies

Data Abstraction; data types, statistical data, time series data, etc.

Principles of graphics and viewing: Colour, alignment, balance, consistency, contrast, proximity, camera positioning, etc.

Type of Visualisation: Data visualisation, information visualisation, concept visualisation.

Visualisation Development: Visualisation design, interaction design, data acquisition, data interpretation (parsing) visualisation development – programming, testing and deployment.

Principles of geometric objects and transformations, 2D and 3D coordinate systems. vectors, matrices and basic vector/matrix operations.

Coordinate Spaces, Euclidean Space vs Vector Space.

Introduction to 3D Data Representation and Resource Usage.

Polygonal representations of manifolds and functions.

Raster vs Vector Graphics

Introduction to Rasterisation for real-time 3D visualisation.

Pipelined Transformation through the Coordinate Spaces: Local -> Model -> Eye -> H.Clip -> Screen

Vertex Operations

Pixel Operations.

Hidden Surface Removal

Learning Activities

Formal lectures will be complemented by hands-on practical laboratory sessions.

Notes

Massive amounts of data are being generated by modern digital systems; there is a

demand for rapid and effective analysis and communication of the relevant data. This module covers topics related to interpreting and displaying data for visualisation and techniques to present various types of data in appropriate formats.