Computer Graphics and Visualisation

Module Information

2022.01, Approved

Summary Information

Module Code	6220COMP
Formal Module Title	Computer Graphics and Visualisation
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
Lecture	33
Practical	11

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

Aims and Outcomes

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

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Critically relate communication requirements to real-time visual graphics.
MLO2	2	Critically analyse graphics used in interactive data visualization.
MLO3	3	Apply key concepts in graphical representation on display devices.
MLO4	4	Evaluate solutions for data and information visualization.

Module Content

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 OperationsPixel Operations. Hidden surface removal2D and 3D Visualisation in Virtual; Reality and Augmented RealityThe role of Visualisation in 21st century
Module Overview	Massive amounts of data are being generated by modern digital systems and 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 alongside techniques to present various types of data in appropriate formats. You will use computer graphic techniques to develop data and information visualisation and be introduced to the theoretical concepts of graphical display, both 2D and 3D, leading to the practical development of visualisation solutions using relevant tools and techniques.
Additional Information	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.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Visualisation Research	50	0	MLO1, MLO2
Technology	Application	50	0	MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Hoshang Kolivand	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings