

## Liverpool John Moores University

Title: DIGITAL GAMES CONTENT PRODUCTION  
Status: Definitive  
Code: **5109COMP** (121231)  
Version Start Date: 01-08-2021

Owning School/Faculty: Computer Science and Mathematics  
Teaching School/Faculty: Computer Science and Mathematics

Team	Leader
Yun Sheng	Y

**Academic Level:** FHEQ5      **Credit Value:** 20      **Total Delivered Hours:** 55  
**Total Learning Hours:** 200      **Private Study:** 145

### Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Practical	33

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Artefacts	AS1	3D Modelling and Texturing (Individual)	50	
Artefacts	AS2	Pre-rendered 3D Animation (Individual)	50	

### Aims

*To explain the digital game content creation workflow.*  
*To develop theoretical knowledge of the concepts and techniques required for 2D graphics, 3D modelling and 3D animation.*  
*To provide students an opportunity to practice the principles of 3D modelling and 3D animation using appropriate tools, techniques and methods.*  
*To explain the concepts and techniques for producing pre-rendered cinematics.*

## Learning Outcomes

After completing the module the student should be able to:

- 1 Identify and interpret artistic requirements of 3D models.
- 2 Apply appropriate low polygon modelling operations and textures to 3D models for incorporation into a game engine using the appropriate techniques and software tools.
- 3 Manage and reuse assets for composition of populated 3D scene.
- 4 Plan and communicate motion graphic sequences for a short cinematic.
- 5 Apply principles of 3D animation to the production of 3D animation sequences for a short cinematic.
- 6 Apply appropriate approach to render 3D animation sequences to file.

## Learning Outcomes of Assessments

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

3D Modelling and Texturing	1	2	3
Pre-rendered 3D Animation	4	5	6

## Outline Syllabus

*Digital Game Content Creation Pipeline: Game Production Timeline, Economic Constraints, Roles in the Game Production Team, Documenting Art Requirements (Concept Art, Storyboarding, Moodboard, Colours), Exporting, Optimising and Loading.*

*2D Graphics: Bitmap, Colour Format, Alpha channel, Resizing and Cropping, Dynamic Range, File Formats (lossy and lossless), Sprite Design, Tiles Design.*

*3D Modelling: Vertices, Edges, Polygons, Primitives, Approaches to Low-poly Modelling (Box-modelling, Virtual Studio setup, Sculpting and retopologising), Operations in Modelling.*

*Texture: Mapping strategies, UV Mapping, Types of Maps (Light Map, Shadow Map, Occlusion Map, Specular/Glossiness Map, Bump Map, Normal Map, Displacement Map), Procedural Textures, Implications of texture size.*

*3D Animation: Evolution of Computer Animation, Principles of 3D Computer Animation, Rigging, Skinning, Kinematics and Constraints, Keyframe animation, Cleaning Motion, Blendshapes, Locomotion, Facial Animation.*

*3D Virtual Scene Composition: Asset planning, Reusing assets, Level of Details (LoD), Procedural Level Generation.*

*Rendering and Lighting: Rendering Pipeline, Lighting and Shadows, Specular and*

*Diffused Light, Radiosity and Global Illumination, Rendering still and animation.*

*Assets Conditioning for Game Engines.*

## **Learning Activities**

Lectures – to deliver the theoretical concepts maths applied to production of game contents and assets.

Practical – Tutor-led practical session in the computer laboratory to introduce specific techniques and methods used in the production of textured 3D models to be incorporated into game engine and 3D animation sequences for off-line rendering.

Further exercises – additional exercises for students to work on in their own time.

Directed learning – provides additional reading to enable practical work to be completed.

Learning materials can be accessed digitally via University Virtual Learning Environment (VLE).

## **Notes**

In this module, students learn about the digital content creation pipeline for games, the associated techniques and tools for creation 2D graphics, 3D models and 3D animation, and rendering and lighting using off the shelf 3D software packages. In the first piece of coursework, students will solely be producing fully textured low-poly 3D models and conditioning it for game engine. In the second coursework, students take a different role within the creative department and will be given ready made 3D models which they need plan out the animation as a team, then rig, skin and animate the 3D models. They will also have to light and render the environment individually for compilation of a short cinematic.