



## MODULE SPECIFICATION

Part 1: Information			
Module Title	3d Modelling and Animation		
Module Code	UFCFEC-30-3	Level	Level 6
For implementation from	2018-19		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Computer Science and Creative Technologies
Department	FET Dept of Computer Sci & Creative Tech		
Contributes towards			
Module type:	Standard		
Pre-requisites	Multimedia Studio 2018-19		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
<p><b>Overview:</b> This module enables students to create and evaluate 3D models and animations and to apply tools and techniques appropriately to achieve a range of effects and optimise performance.</p> <p><b>Educational Aims:</b> The theory underlying specific graphics and animation techniques is covered to a level that will enable students to make informed judgements about their application in practice, but does not involve extensive use of mathematics. Students will be expected to understand factors that may influence the way in which animations are perceived and interpreted by a viewer and to apply a user-centred approach in the development of their work.</p> <p><b>Outline Syllabus:</b> Perception and interpretation of visual information; implications for 3D modelling and animation. Review of 3D modelling concepts, tools and techniques.</p> <p>Motion graphics and animation; historical and contemporary graphics practice, storytelling; Principles, processes and techniques involved in creating animations.</p> <p>Interaction; forms of interaction you might want to use, interaction design. Implementing</p>

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interaction; the use of visual and event-driven programming to create interactive elements.

Lighting theory and practice. Use and placing of cameras in a scene, camera attributes and control. Using lighting to create moods. Character lighting. Lighting of objects and world environment; shadows and reflections.

Rendering techniques; scanline and rasterisation, ray casting and ray tracing, advantages and disadvantages of different techniques. Control and optimisation of rendering output; sampling and filtering, optimisation.

Surface materials and shading. Shading models. Texture mapping. Comparison of flat, Gourad, and Phong shading techniques. Global illumination and radiosity. Efficiency issues and perceptual effectiveness.

Character animation; principles underlying inverse kinematics, reactive animation, and rigid body dynamics and their application in 3D animation. Rigging and skinning. Morphing and walk cycles. Characterisation; developing a character beyond the 3D model.

Motion capture; principles and applications. Optical systems and the merits of different types of optical markers. Markerless and hybrid systems; computer vision techniques. Non-optical systems; mechanical motion and inertial sensors. Turning motion capture data into a usable animation.

Facial animation; conveying emotion and understanding the impact of facial expression on characterisation. Lip sync animation; basic phonemes, how the shape of the mouth changes with different sounds, software solutions.

Building 3D worlds. Technologies, tools and techniques. Immersive systems, virtual and augmented reality.

Programming interactive 3D environments. Avatars. Social interaction in virtual worlds.

### **Teaching and Learning Methods:** Hours

Contact time 72

Assimilation and development of knowledge 148

Exam preparation 40

Coursework preparation 40

Total study time 300

Students will learn through a combination of lectures and practical activities in a computer laboratory. Students will be expected to learn independently by carrying out reading and directed study beyond that available within taught classes, including undertaking two individual projects leading to their coursework assignments.

### **Part 3: Assessment**

Assessment is divided between an exam to test both theoretical and analytical skills and two coursework assignments.

The examination (A component) will typically consist of a compulsory section focusing on core technical knowledge and a selective section testing more specialised in-depth knowledge.

The two coursework assignments (B component) will be assessed in terms of the quality of design, the effective application of 3D modelling and animation techniques, and the communication of information through supporting documentation and depth of reflection.

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First Sit Components	Final Assessment	Element weighting	Description
Project - Component B		35 %	Individual modelling and animation assignment, including documentation and reflective report
Project - Component B		35 %	Individual 3D world / character animation assignment, including documentation and reflective report
Examination - Component A	✓	30 %	Examination (3 hours)
Resit Components	Final Assessment	Element weighting	Description
Project - Component B		70 %	Individual assignment, including documentation and reflective report
Examination - Component A	✓	30 %	Examination (3 hours)

Part 4: Teaching and Learning Methods													
Learning Outcomes	On successful completion of this module students will be able to:												
	<table border="1"> <thead> <tr> <th colspan="2">Module Learning Outcomes</th> </tr> </thead> <tbody> <tr> <td>MO1</td> <td>Apply effectively and evaluate a range of tools and techniques used in the creation, manipulation and control of 3D models and animated sequences</td> </tr> <tr> <td>MO2</td> <td>Demonstrate an understanding of factors influencing the perception and interpretation of digital images and animated sequences</td> </tr> <tr> <td>MO3</td> <td>Use knowledge of lighting principles and surface properties to manipulate the illumination of a scene and create lighting effects</td> </tr> <tr> <td>MO4</td> <td>Create and critically evaluate sophisticated character models and animated sequences containing characters</td> </tr> <tr> <td>MO5</td> <td>Use modelling tools to build 3D worlds and program interactive 3D environments</td> </tr> </tbody> </table>	Module Learning Outcomes		MO1	Apply effectively and evaluate a range of tools and techniques used in the creation, manipulation and control of 3D models and animated sequences	MO2	Demonstrate an understanding of factors influencing the perception and interpretation of digital images and animated sequences	MO3	Use knowledge of lighting principles and surface properties to manipulate the illumination of a scene and create lighting effects	MO4	Create and critically evaluate sophisticated character models and animated sequences containing characters	MO5	Use modelling tools to build 3D worlds and program interactive 3D environments
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Contact Hours	<b>Contact Hours</b>												
	<b>Independent Study Hours:</b>												
	Independent study/self-guided study	228											
	<b>Total Independent Study Hours:</b>	228											
	<b>Scheduled Learning and Teaching Hours:</b>												
Face-to-face learning	72												

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	<b>Total Scheduled Learning and Teaching Hours:</b>	72
	<b>Hours to be allocated</b>	300
	<b>Allocated Hours</b>	300
Reading List	<p><i>The reading list for this module can be accessed via the following link:</i></p> <p><a href="https://uwe.rl.talis.com/index.html">https://uwe.rl.talis.com/index.html</a></p>	