



Module Specification

3d Modelling and Animation

Version: 2023-24, v2.0, 27 Feb 2023

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Part 1: Information

Module title: 3d Modelling and Animation

Module code: UFCFEC-30-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: Media Studio 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: 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.

Features: Not applicable

Educational aims: 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.

Outline syllabus: Perception and interpretation of visual information; implications for 3D modelling and animation. Review of 3D modelling concepts, tools and techniques.

Motion graphics and animation; historical and contemporary graphics practice, storytelling; Principles, processes and techniques involved in creating animations.

Interaction; forms of interaction you might want to use, interaction design. Implementing 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, Gouraud, 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.

Part 3: Teaching and learning methods

Teaching and learning methods: Hours

Contact time 72

Assimilation and development of knowledge 148

Coursework preparation 80

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.

Module Learning outcomes: On successful completion of this module students will achieve the following 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

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/lists/E03D0D46-2080-F661-4080-21B4F5111730.html) via the following link <https://uwe.rl.talis.com/lists/E03D0D46-2080-F661-4080-21B4F5111730.html>

Part 4: Assessment

Assessment strategy: Assessment is divided between two coursework assignments, one focusing more on creating 3D models/ animations, one on creating character animations/ 3D worlds.

The two coursework assignments 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.

Core technical knowledge and specialised in-depth knowledge about 3D animation aspects will be assessed via the written elements of the two coursework submissions.

REsit: students resubmit improved work

Assessment tasks:

Project (First Sit)

Description: Individual modelling and animation assignment, including documentation and reflective report

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO3

Project (First Sit)

Description: Individual 3D world / character animation assignment, including documentation and reflective report

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO4, MO5

Project (Resit)

Description: Individual modelling and animation assignment, including documentation and reflective report

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO3

Project (Resit)

Description: Individual 3D world / character animation assignment, including documentation and reflective report

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Digital Media [SHAPE] BSc (Hons) 2023-24

Digital Media [SHAPE] BSc (Hons) 2023-24

Digital Media [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Digital Media {Foundation}[Sep][FT][Frenchay][4yrs] BSc (Hons) 2020-21

Digital Media [Sep][SW][Frenchay][4yrs] BSc (Hons) 2020-21

Digital Media {Foundation}[Sep][SW][Frenchay][5yrs] BSc (Hons) 2019-20