



MODULE SPECIFICATION

| Part 1: Information | | | |
|---------------------------|--|--------------------|--|
| Module Title | 3d Modelling and Animation | | |
| Module Code | UFCFEC-30-3 | Level | Level 6 |
| For implementation from | 2019-20 | | |
| 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 | | |
| Module type: | Standard | | |
| Pre-requisites | Media Studio 2019-20 | | |
| Excluded Combinations | None | | |
| Co- requisites | None | | |
| Module Entry requirements | None | | |

| Part 2: Description |
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| <p>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.</p> <p>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.</p> <p>Outline Syllabus: 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 interaction; the use of visual and event-driven programming to create interactive elements.</p> <p>Lighting theory and practice. Use and placing of cameras in a scene, camera attributes and</p> |

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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.

| First Sit Components | Final Assessment | Element weighting | Description |
|-----------------------|------------------|-------------------|--|
| Project - Component B | | 35 % | Individual modelling and animation assignment, including documentation and reflective report |

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|---------------------------|-------------------------|--------------------------|---|
| 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 achieve the following learning outcomes: | | | | | | | | | | | | | | | | | |
|---|---|--------------------------|--------------------------|---|-------------------------------------|--|---------------------------------------|---|--|--|-----------------------|--|---|----|------------------------------|-----|------------------------|-----|
| | <table border="1"> <thead> <tr> <th>Module Learning Outcomes</th> <th>Reference</th> </tr> </thead> <tbody> <tr> <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> <td>MO1</td> </tr> <tr> <td>Demonstrate an understanding of factors influencing the perception and interpretation of digital images and animated sequences</td> <td>MO2</td> </tr> <tr> <td>Use knowledge of lighting principles and surface properties to manipulate the illumination of a scene and create lighting effects</td> <td>MO3</td> </tr> <tr> <td>Create and critically evaluate sophisticated character models and animated sequences containing characters</td> <td>MO4</td> </tr> <tr> <td>Use modelling tools to build 3D worlds and program interactive 3D environments</td> <td>MO5</td> </tr> </tbody> </table> | Module Learning Outcomes | Reference | Apply effectively and evaluate a range of tools and techniques used in the creation, manipulation and control of 3D models and animated sequences | MO1 | Demonstrate an understanding of factors influencing the perception and interpretation of digital images and animated sequences | MO2 | Use knowledge of lighting principles and surface properties to manipulate the illumination of a scene and create lighting effects | MO3 | Create and critically evaluate sophisticated character models and animated sequences containing characters | MO4 | Use modelling tools to build 3D worlds and program interactive 3D environments | MO5 | | | | | |
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| Apply effectively and evaluate a range of tools and techniques used in the creation, manipulation and control of 3D models and animated sequences | MO1 | | | | | | | | | | | | | | | | | |
| Demonstrate an understanding of factors influencing the perception and interpretation of digital images and animated sequences | MO2 | | | | | | | | | | | | | | | | | |
| Use knowledge of lighting principles and surface properties to manipulate the illumination of a scene and create lighting effects | MO3 | | | | | | | | | | | | | | | | | |
| Create and critically evaluate sophisticated character models and animated sequences containing characters | MO4 | | | | | | | | | | | | | | | | | |
| Use modelling tools to build 3D worlds and program interactive 3D environments | MO5 | | | | | | | | | | | | | | | | | |
| Contact Hours | <table border="1"> <thead> <tr> <th colspan="2">Independent Study Hours:</th> </tr> </thead> <tbody> <tr> <td>Independent study/self-guided study</td> <td>228</td> </tr> <tr> <td>Total Independent Study Hours:</td> <td>228</td> </tr> <tr> <th colspan="2">Scheduled Learning and Teaching Hours:</th> </tr> <tr> <td>Face-to-face learning</td> <td>72</td> </tr> <tr> <td>Total Scheduled Learning and Teaching Hours:</td> <td>72</td> </tr> <tr> <td>Hours to be allocated</td> <td>300</td> </tr> <tr> <td>Allocated Hours</td> <td>300</td> </tr> </tbody> </table> | | Independent Study Hours: | | Independent study/self-guided study | 228 | Total Independent Study Hours: | 228 | Scheduled Learning and Teaching Hours: | | Face-to-face learning | 72 | Total Scheduled Learning and Teaching Hours: | 72 | Hours to be allocated | 300 | Allocated Hours | 300 |
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| Reading List | <p>The reading list for this module can be accessed via the following link:</p> <p>https://uwe.rl.talis.com/index.html</p> | | | | | | | | | | | | | | | | | |

| Part 5: Contributes Towards |
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| This module contributes towards the following programmes of study: |