Unit 38: 3D Computer Modelling and Animation

Unit code: J/601/6780

QCF Level 5: BTEC Higher National

Credit value: 15

Aim

This unit aims to develop learners' skills and understanding of the principles and practical applications of 3D modelling and animation.

Unit abstract

The unit supports learners to visualise and design three-dimensional space and object forms that exist within it. An appreciation of the requirements and applications of computer modeling and animation in commercial contexts may be used to inform learners' development of personal animation work. Learners may also consider the technical requirements for producing and distributing digital animation effectively. Learners should gain a working knowledge of 3D computer modeling and animation software, through applying techniques in their own animation work. Research elements of the unit allow learners to review the work of 3D computer artists.

Learners should develop creative responses to a set or self-generated brief, through exploring the potential offered by digital animation. Whilst the technical requirements of this field are demanding, learners should also be encouraged to reflect on creative approaches. Learners should work though stages such as visualisation and identifying technical requirements for scenes and models. Animation is a dynamic process, and learners may need to explore alternative approaches to be able to realise their creative intentions.

Learning outcomes

On successful completion of this unit a learner will:

1 Understand how 3D computer modelling and animation are applied in commercial contexts

2 Be able to create a complex 3D scene

3 Be able to create a 3D model within a scene

4 Be able to produce 3D animations to meet a creative brief.

Unit content

1 **Understand how 3D computer modelling and animation are applied in commercial contexts**

Productions: interactive media; video; web; television; film; CGI; gaming; special effects; animation

Production resources: machine specification; memory requirements; rendering time; software

Output: download time; web-based; machine specification; end-user; interface

Formats: models; animations; environments; factors eg compression, workflow, assets, deliverables,

Output requirements: frames eg per second, size, rate; resolution; colour depth; initialising; bandwidth, real-time; streaming; downloading

Evaluate: purpose eg commercial, artistic, target audience, interactivity; context eg communication, entertainment, promotion, marketing, advertising; references eg work of others, animation studios, mainstream studios, independent animators

2 **Be able to create a complex 3D scene**

Tools: V plane; H plane; scale; stretch; link; unlink; render; zoom; navigate

Objects: geometric eg cube, sphere, cylinder; light objects; camera objects; adding; deleting; naming; aiming

Lights: colours; intensity; types; invisible; positioning; rotating

Render modes: ray trace; shade best; phong; gouraud; wireframe

Techniques: select; link; unlink; render

Scene: visualize; location eg interior, exterior; type eg natural, scientific, imaginative, realistic, architectural, environment; references eg historical, contemporary; textures

Technical issues: files; formats; compression; output; memory

3 **Be able to create a 3D model within a scene**

Objects: extrude; freeform; spline; lathe

Editing objects: spline form; path view; cross-section

Linking: hierarchy eg parent, child; grouping; ungrouping

Surfaces: applying; editing; composing; properties; maps; images; layers

Techniques: Boolean facility; environment maps; rigging; motion capture

Create: visualize; select sources eg subject, photography, drawings, models, own work, work of others; apply visual language eg shape, form, scale, colour, contrast

4 **Be able to produce 3D animations to meet a creative brief**

Animation tools: sequencer eg preview, spool, time bar, timelines, eventmarks; adding; deleting; overlapping; motion paths eg spline-based, linear; velocity eg graphs, control; keyframes; gravity control; simulators

Types: animation eg character, product; capture eg motion, performance

Animation techniques: morphing; kinematics; animating lights; texture mapping; rigging, tweening

Produce: sources eg images, characters, subject; themes eg narrative, action; factors eg clarity, detail, sound, humour, irony

Evaluate: planning; intuition; response; choices eg technology; format, visual language

Learning outcomes and assessment criteria

Learning outcomes On successful completion of this unit a learner will:	Assessment criteria for pass The learner can:
LO1 Understand how 3D computer modelling and animation are applied in commercial contexts	1.1 Evaluate the application of 3D computer modelling and animation in a commercial context 1.2 Analyse technical requirements for 3D computer modelling and animation in a commercial context
LO2 Be able to create a complex 3D scene	2.1 Develop a complex scene using available geometric objects 2.2 Select tools and techniques appropriate to creative intentions
LO3 Be able to create a 3D model within a scene	3.1 Use editing tools to create custom objects. 3.2 Apply knowledge of hierarchy and linking 3.3 Modify an existing preset object to meet creative intentions
LO4 Be able to produce 3D animations to meet a creative brief	4.1 Use camera views creatively and effectively 4.2 Apply morphing techniques 4.3 Produce effective animation work that combines scenic and character elements.

Guidance

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

The learning outcomes associated with this unit are closely linked with:

Level 3	Level 4	Level 5
Unit 30: Digital Graphics	Unit 11: Digital Media in Art and Design	Unit 37: Digital Image Creation and Development
Unit 35: Digital Graphics for Interactive Media	Unit 12: 2D, 3D, and Time-based Digital Applications	
Unit 37: 2D Animation Production	Unit 13: Multimedia Design and Authoring	

This unit has links to the Level 4 and Level 5 National Occupational Standards for IT and Telecoms Professionals, particularly the areas of competence of:

- Human Computer Interaction/Interface (HCI) Design

Essential requirements

Learners must have access to specialist facilities relevant to this unit.

Employer engagement and vocational contexts

Centres should develop links with practising artists, craftspeople and designers, to deliver assignments to learners or to provide work experience. A lecture or visit by a web designer or design practitioner local to the centre may provide useful and pertinent information on working practice.

Links with employers are essential to the delivery of the programme for work experience and future employment. Assignments should be vocationally relevant; centres should consider the delivery of 'live projects' for example to support the vocational content of the unit and programme.