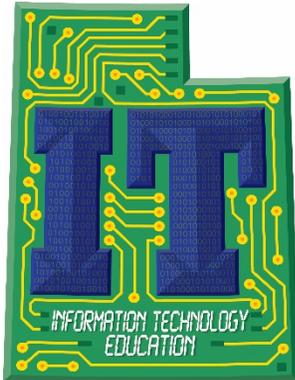# STRANDS AND STANDARDS
3D GRAPHICS

Course Description

3D Graphics is a one-semester course. Students will use 3D graphics software to produce 3D models. This course will introduce students to 2D and 3D modeling, the creation and application of textures, mapping, lighting, camera techniques, and rendering of 3D models.

Intended Grade Level	10-12
Units of Credit	0.5
Core Code	35.02.00.00.070
Concurrent Enrollment Core Code	35.05.00.13.070
Prerequisite	Business Office Specialist, Digital Media I, Digital Media 2 or Teacher Approval
Skill Certification Test Number	818
Test Weight	0.5
License Type	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Multimedia
Endorsement 2	N/A
Endorsement 3	N/A

STRAND 1

Students will identify the applications of 3D graphics and animation through exploring the career opportunities and the relevant history of the industry.

Standard 1

Identify various applications of 3D graphics and animation, such as:

- Identify uses of 3D in Entertainment
- Identify uses of 3D in Health Sciences
- Identify uses of 3D in Architecture and Engineering
- Identify uses of 3D in Aerospace
- Identify uses of 3D in Advertising
- Identify uses of 3D in Graphic Design and Illustration

Standard 2

Develop career awareness related to working in the 3D graphics and animation industry.

- Identify personal interests and abilities related to 3D Graphics careers, such as: 1) Identify personal creative talents, 2) Identify organizational and leadership skills, 3) Identify special interest areas
- Identify 3D graphics and animation job titles, such as: Animator, Industrial Designer, 3D Modeler, Technical Director
- Investigate career opportunities, trends, and requirements related to 3D graphics and animation careers
- Identify the members of a 3D graphics and animation team
- Investigate trends associated with 3D graphics and animation careers
- Develop a realistic Student Plan for College and Career Readiness to help guide further educational pursuits
- Identify factors for employability and advancement in 3D careers
- Survey existing 3D graphics and animation businesses to determine what training is required
- Survey universities and colleges to determine programs, degrees and training availability
- Develop employability competencies/characteristics: responsibility, dependability, ethics, respect, and cooperation
- Achieve high standards of personal performance with a positive work ethic and attitude

Standard 3

Discuss the relevant history of the 3D graphics & animation industry.

- Identify Early 2D animations on film
- List Key mile markers in animation
- Identify Key figures and animators in animation history

STRAND 2

Students will create a basic 3D model as an introduction to the 3D development process.

Standard 1

Introduce basic 3D terminology and the 3D application interface.

- Know 3D terminology
- Identify parts of the 3D application interface

Standard 2

Create a 3D model. (Include modeling, surface materials, camera, lighting, moving, scaling, and rendering)

- Include modeling
- Add surface materials
- Set cameras and lighting
- Move and scale the model
- Render the model

Standard 3

Create an environment/background.

- Create an environment for a 3D project
- Create a background for a 3D project

STRAND 3

Students will model 3D objects.

Standard 1

Use and manipulate 3D graphics and Primitives.

- Use 3D primitives
- Manipulate 3D models and primitives.

Standard 2

Create, use and manipulate shapes.

- Create 3D shapes
- Use 3D shapes
- Manipulate 3D shapes

Standard 3

Edit models.

- Extrusion
- Use Boolean
- Use Beveling
- Use Lathe/Revolve
- Add and remove Grouping
- Understand Model Hierarchy (parent/child)

- Use Reshape/Convert
- Use Duplication/Mirroring
- Understand and use Pivot/Origin Points
- Make a surface from Curves (lofting/skinning)
- Subdivide an model
- Modify edges, faces, vertices
- Use a reference graphic/image/drawing (background)
- Edit an object after its been created (history)
- Use other software specific tools

STRAND 4

Students will apply surface materials to 3D models.

Standard 1

Create, Apply and edit surface materials.
- Add & edit Color
- Add & edit Texture
- Add & edit Procedurals
- Change Luminosity
- Use Transparency
- Work with Reflective
- Add & edit UV Mapping

STRAND 5

Students will apply lighting and camera techniques to achieve intended effects.

Standard 1

Apply lighting effects.
- Use basic three point lighting for artistic effect: key, fill, rim
- Use other realistic lighting: indoor, outdoor, mood, artistic, etc.
- Understand & use 3D specific lighting sources: Global/Image Based, Directional, Spot Lights, Shadows/Shading, Point Light

Standard 2

Apply camera effects.
- Adjust Aspect Ratio/Film Back
- Change setting and modifying camera views: Staging and Manipulating, Truck, Pan, Zoom, Dolly

STRAND 6
Students will animate 3D models. (Covered in 3D Animation.)

STRAND 7
Students will render 3D models.

Standard 1
Introduce and apply the mechanics of rendering.
- Use Ray tracing
- Adjust Shadows/Lighting
- Output different File Types
- Output appropriate Resolutions and Destinations
- Use appropriate Naming Conventions

Work Place Skills
Communication, Problem Solving, Teamwork, Critical Thinking, Dependability, Accountability

Skill Certificate Test Points by Strand

Test Name	Test #	Number of Test Points by Strand										Total Points	Total Questions
		1	2	3	4	5	6	7	8	9	10		
3D Graphics	**818**	4	6	13	7	8		5				43	41