

# STRANDS AND STANDARDS

## 3D GRAPHICS 1



### Course Description

In this course, students will learn how to create and manipulate 3D models using specialized software. They will explore various aspects of 3D graphics, such as texturing, mapping, lighting, camera movement, and rendering. They will apply their skills and knowledge to produce realistic and artistic 3D images.

Intended Grade Level	9-12
Units of Credit	0.5
Core Code	35.02.00.00.070
Concurrent Enrollment Core Code	35.02.00.13.070
Prerequisite	None
Skill Certification Test Number	818 9492 - Autodesk Maya
Skill Certification Cut Score	<b>818 - 72%</b> 9492- Certiport (no cut score)
Test Weight	0.5
License Area of Concentration	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 career opportunities available within 3D Graphics.

### Standard 1

- Identify various applications of 3D graphics, 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
- Identify uses of 3D in Manufacturing and 3D Printing

### Standard 2

Identify career awareness related to working in the 3D Graphics industry.

- Demonstrate career awareness in the 3D Graphics industry
- Identify the following job titles and responsibilities: Industrial Designer, Technical Director, Graphic Designer, Lighting Technician, Character Modeler, Texture Artist, Render Artist, Environmental Artist, etc.
- Identify Post-Secondary Education programs and degrees related to the field

### Performance Skills

- Identify various applications of 3D graphics.
- Identify career opportunities in the 3D graphics and animation industry.

## STRAND 2

Students will create a basic 3D scene

### Standard 1

Demonstrate basic 3D application navigation.

- Cartesian coordinate system (x, y, z)
- Grid
- Snap
- Perspective vs. orthographic views
- Workspaces
- Understand basic keystroke and shortcut keys
- Wireframe vs. solid shading

### Standard 2

Create a 3D scene.

- Create Primitive shapes (Cone, Cube, Sphere, Cylinder)
- Modify Primitive shapes (Translate/Move, Scale, Rotate)
- Model basic background or environment
- Add surface materials
- Set cameras and lighting Render the scene

### Standard 3

Organize scene models.

- Understand Model Hierarchy (parent/child relationships)
- Naming conventions
- Combine/Join geometry
- Add and remove Grouping (collections)

## Performance Skills

Create, organize, and render a basic 3D scene.

## STRAND 3

Students will model 3D objects.

### Standard 1

Understand and edit basic polygon model components.

- Vertices
- Edges
- Faces
- Pivot/Origin Point

### Standard 2

Use additional techniques to create, modify, and edit polygon models.

- Extrusion
- Boolean
- Beveling
- Lathe/Revolve/spin
- Insert edge loop (loop cut)
- Duplication and Mirroring
- Make a surface from Curves (lofting/skinning)
- Subdivision
- Reference image
- Sculpting geometry

### Performance Skills

Create 3D objects using multiple modeling techniques.

## STRAND 4

Students will apply surface materials to 3D models.

### Standard 1

Create, apply, and edit surface materials.

- Imported Texture vs. Procedurals
- Transparency/Opacity
- Reflectivity/Specularity
- Normal Maps/Bump Maps
- Displacement/Height Maps
- Luminosity
- Color/Albedo Maps

### Standard 2

Create and edit UV Maps.

- Unwrap
- Unwrapping
- Optimize

### Performance Skills

Students will apply appropriate materials to 3D models.

## STRAND 5

Students will understand and apply lighting and camera techniques.

### Standard 1

Apply lighting effects.

- Use basic three-point lighting: key, fill, back/rim
- Use other lighting techniques: indoor, outdoor, mood, artistic, etc.
- Understand & use 3D specific lighting sources: Global/Image Based, Directional, Spotlights, Point Light, etc.

### Standard 2

Effective use of camera techniques.

- Aspect Ratio
- Staging
- Focal Length/Depth of Field
- Camera Angle (bird's eye, worm's view, etc.)
- Shot Framing (close-up, medium, and wide, etc.)

### Performance Skills

Students will be able to apply various lighting and camera techniques to enhance quality of composition.

## STRAND 6

Students will render 3D models.

### Standard 1

Introduce and apply the mechanics of rendering.

- Understand render engines
- Adjust lighting
- Demonstrate the use of different output file types (i.e.: PNG, TIFF, JPEG, etc.)
- Output appropriate resolutions and destinations
- Use appropriate naming conventions

### Performance Skills

Students will be able to finalize their projects by using the appropriate render setting.

Workplace Skills

Workplace Skills taught:

- Communication
- Problem Solving
- Teamwork
- Critical Thinking
- Dependability
- Accountability

Skill Certification 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		