

STRANDS AND STANDARDS

3D GRAPHICS



Course Description

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

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	Digital Media 2 or Teacher Approval
Skill Certification Test Number	818 9492 - Autodesk Maya
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 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
- Identify uses of 3D in Manufacturing and 3D Printing

Standard 2

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

- Develop 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
- Develop the following professional behaviors including punctuality, responsibility, teamwork, ethics, etc.

Performance Skills

- Identify various applications of 3D graphics.
- Identify career opportunities in the 3D graphics and animation industry.
- Developed a realistic Student Plan for College and Career Readiness to guide further educational/occupational pursuits.

STRAND 2

Students will create a basic 3D scene

Standard 1

Introduce 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.
- Editing and manipulating shadows

Standard 2

Effective use of camera techniques.

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

Performance Skills

Student 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.

- Ray tracing / Path tracing
- Adjust shadows/lighting
- Understand 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		