



# Regional Occupational Program

## 3D Animation A-G 2026-2027

### COURSE DESCRIPTION

This course is designed to instruct students on the basics of animation, writing, and creating animated projects. Students will learn how to plot, script, storyboard, present, and create animated projects using various animation techniques. Storyboarding, mechanics of motion, camera techniques, 3D Animation, modeling, texturing, and advanced rendering techniques will be an integral part of the course. Students that achieve competency will have an opportunity for employment as multimedia artist/ animator, graphic artist, and cartoonist.

#### Course Information:

|                  |                                |
|------------------|--------------------------------|
| Course Length:   | 1 Year                         |
| Prerequisite:    | None                           |
| Course Level:    | Concentrator                   |
| UC:              | Yes "g" elective               |
| Articulated:     | No                             |
| Industry Cert.:  | No                             |
| Industry Sector: | Arts, Media, and Entertainment |
| Pathway:         | Design, Visual, and Media Arts |
| CALPADS:         | 7214                           |

#### O\*Net SOC Codes:

|            |                               |
|------------|-------------------------------|
| 27-1024    | Graphic Designer              |
| 27-1014    | Special Effects and Animators |
| 15-1255.01 | Video Game Designers          |

#### Legend:

|          |   |
|----------|---|
| CTE - PS | CTE Pathway Standards                             |
| CRP      | Career Ready Practices                            |
| CTE - AS | CTE Anchor Standards                              |
| CCSS     | Common Core State Standards                       |
| ISTE     | International Society for Technology in Education |

*Includes updates from the 25/26 Arts, Media and Entertainment Advisory  
[Advisory Minutes](#)*

## 3D Animation

### Course Orientation

- a. Discuss objectives for this course, including competencies, teacher expectations, classroom policies, and procedures.
- b. Identify and discuss the acquisition of transferable skills (communication, collaboration, creativity, and critical thinking) and their importance to being college and career ready and for future personal and professional success.
- c. Review objectives, competencies, and course syllabus.
- d. Discuss student and teacher expectations, including behavior, class rules, appropriate dress, pre-course knowledge, and grading policies, including enrollment and attendance requirements and procedures, and classroom/school safety and disaster procedures.
- e. Discuss next steps in course sequence related to the career pathway, the need for reinforcement of basic skills, transferable skills, and post-secondary and career options.
- f. Discuss the Big Six: Career Ready Essentials and the Standards for Career Ready Practice as they relate to this course, all aspects of the industry sector, and being college and career ready.

### Big Six: Career Ready Essentials

| 1. Effective Communication  | CTE – PS | CRP  | CTE - AS  | CCSS   | ISTE   |
|---|----------|--|---|--|--|
| <ol style="list-style-type: none"> <li>a. <b>Demonstrate effective verbal communication and conflict resolution skills.</b></li> <li>b. <b>Use the writing process to develop written communication with the appropriate tone, organization, and format for the identified audience.</b></li> <li>c. Explain the effect of interpersonal skills on one's ability to communicate effectively and develop relationships.</li> <li>d. Describe the impact of ineffective communication on business relationships.</li> <li>e. Analyze the impact of vocabulary, body language, and tone on verbal communication.</li> <li>f. Demonstrate active listening skills.</li> <li>g. Accurately interpret industry-specific written communication.</li> <li>h. Model responsible and effective use of various communication technologies.</li> <li>i. Identify valid and reliable digital reference and resource materials.</li> <li>j. Gather information from multiple digital sources to compare and contrast, synthesize, and summarize.</li> <li>k. Identify and use appropriate communication and collaboration technologies.</li> <li>l. Utilize technology to problem solve, accomplish tasks, and to produce or publish products.</li> </ol> |          | <a href="#">1</a><br><a href="#">2</a><br><a href="#">11</a>                     | <a href="#">2</a><br><a href="#">3</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">7</a><br><a href="#">8</a><br><a href="#">9</a><br><a href="#">10</a><br><a href="#">11</a> | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">SLS</a><br><a href="#">11-12.2</a><br><a href="#">9-10</a><br><a href="#">11-12.1</a><br><a href="#">11-12.1d</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a><br><a href="#">11-12.6</a> | <a href="#">1b,c</a><br><a href="#">2c</a><br><a href="#">3b,c</a><br><a href="#">5c</a><br><a href="#">6b,c,d</a> |
| 2. Collaboration, Creativity, and Critical Thinking   | CTE - PS | CRP  | CTE - AS  | CCSS   | ISTE   |
| <ol style="list-style-type: none"> <li>a. <b>Demonstrate critical thinking skills for a variety of purposes and in different settings.</b></li> <li>b. <b>Collaborate to reach consensus on an identical objective through the sharing of knowledge, tasks, and learning.</b></li> <li>c. Discuss the importance of the critical thinking process to real-world applications.</li> </ol>  |          | <a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">7</a> | <a href="#">2</a><br><a href="#">3</a><br><a href="#">4</a><br><a href="#">5</a>  | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11- 12.6</a><br><br><a href="#">SLS</a>  | <a href="#">1c</a><br><a href="#">3c,d</a><br><a href="#">4a-d</a><br><a href="#">5c,d</a>                         |

|  |                 |   |  |  |  |
|--|-----------------|---|--|--|--|
| <ul style="list-style-type: none"> <li>d. Evaluate the impact of creative thinking on problem solving and innovation in real-world applications.</li> <li>e. Compile work that demonstrates the process used to (elaborate, refine, analyze) evaluate original ideas and maximize creative efforts.</li> <li>f. Apply divergent and convergent thinking to the development of an original idea or solution.</li> <li>g. Examine real-world limits to adopting ideas.</li> <li>h. Demonstrate creative thinking (preparation, insight, evaluation, elaboration, and communication) to create a new idea or concept.</li> <li>i. Assume shared responsibility for collaborative work, and value the individual contributions made by each team member.</li> <li>j. Evaluate evidence, arguments, claims, and beliefs to identify connections.</li> <li>k. Identify bias, prejudice, propaganda, self-deception, distortion, and misinformation.</li> <li>l. Produce intellectual, informational, or material products that serve an authentic purpose.</li> <li>m. Work effectively and respectfully with those from diverse backgrounds or cultures.</li> <li>n. Demonstrate respect, trust, commitment, and the ability to compromise in collaborative projects.</li> </ul>                                  |                 | <a href="#">9</a><br><a href="#">10</a><br><a href="#">11</a> | <a href="#">7</a><br><a href="#">8</a><br><a href="#">9</a><br><a href="#">11</a>                      | <a href="#">9-10</a><br><a href="#">11-12.1</a><br><a href="#">11-12.1d</a><br><a href="#">11-12.2</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a><br><a href="#">11-12.6</a> | <a href="#">6c</a><br><a href="#">7b,c,d</a>                       |
| <b>3. Leaders and Teams: Roles and Responsibilities</b>  | <b>CTE – PS</b> | <b>CRP</b>  | <b>CTE - AS</b>  | <b>CCSS</b>  | <b>ISTE</b>  |
| <ul style="list-style-type: none"> <li>a. <b>Determine the individual and team members' roles and responsibilities.</b></li> <li>b. <b>Demonstrate leadership skills and qualities (i.e., reliability, negotiation skills, initiative, positive reinforcement, recognition of others' efforts, problem-solving skills, conflict resolution, and delegation).</b></li> <li>c. Explain the importance of technical, social, and communication skills to team success.</li> <li>d. Compare and contrast leadership styles and their effectiveness in various situations.</li> <li>e. Organize and delegate responsibilities in a team setting to encourage ideas, perspectives, and contributions from all team members.</li> <li>f. Develop a strong sense of team identity by brainstorming solutions, volunteering, assisting others, practicing respect and courtesy, and taking initiative.</li> <li>g. Examine situations in which a follower becomes the leader.</li> <li>h. Describe twenty-first-century skills required across all occupations.</li> <li>i. Identify and discuss the characteristics of a successful team (i.e., leadership, cooperation, and effective decision-making).</li> <li>j. Leverage social and cultural differences to increase innovation and quality of work.</li> </ul> |                 | <a href="#">7</a><br><a href="#">8</a><br><a href="#">9</a>   | <a href="#">3</a><br><a href="#">7</a><br><a href="#">8</a><br><a href="#">9</a><br><a href="#">11</a> | <a href="#">SLS</a><br><a href="#">11-12.2</a><br><a href="#">9-10</a><br><a href="#">11-12.1</a><br><a href="#">11-12.1d</a><br><br><a href="#">WS</a><br><a href="#">11-12.6</a>     | <a href="#">7a,c</a>   |
| <b>4. Legal, Ethical, and Environmental Considerations</b>   | <b>CTE - PS</b> | <b>CRP</b>  | <b>CTE - AS</b>  | <b>CCSS</b>  | <b>ISTE</b>  |
| <ul style="list-style-type: none"> <li>a. <b>Demonstrate industry specific ethical and legal practices.</b></li> <li>b. <b>Identify eco-friendly industry specific practices and resources.</b></li> <li>c. Identify local, state, and federal regulatory agencies, entities, laws, and regulations.</li> </ul>  |                 | <a href="#">5</a><br><a href="#">7</a><br><a href="#">8</a>   | <a href="#">3</a><br><a href="#">5</a><br><a href="#">7</a>  | <a href="#">WS</a><br><a href="#">11-12.6</a><br><a href="#">11-12.7</a>   | <a href="#">2a,b</a><br><a href="#">3a,b</a><br><a href="#">5c</a> |

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|---|-----------------|--|---|---|--|
| <ul style="list-style-type: none"> <li>d. Identify discrimination based on race, nationality, religion, gender, age, disability, or sexual orientation.</li> <li>e. Summarize the ethical and legal implications of workplace discrimination and harassment.</li> <li>f. Explain the concept of corporate citizenship.</li> <li>g. Examine an employer's role in protecting the health and welfare of employees, the community, and the environment.</li> <li>h. Analyze current environmental laws and regulations and their impact on industry.</li> <li>i. Compare and contrast both society's and industry's impact on the environment.</li> </ul>  |                 | <a href="#">12</a>   | <a href="#">8</a><br><a href="#">9</a><br><a href="#">11</a>  | <a href="#">SLS</a><br><a href="#">9-10</a><br><a href="#">11-12.1</a><br><a href="#">11-12.1d</a><br><a href="#">11-12.2</a>   | <a href="#">6c</a>   |
| <b>5. Personal Growth and Career Planning</b>   | <b>CTE - PS</b> | <b>CRP</b>   | <b>CTE - AS</b>   | <b>CCSS</b>   | <b>ISTE</b>  |
| <ul style="list-style-type: none"> <li>a. <b>Demonstrate continued personal development and growth.</b></li> <li>b. <b>Develop and manage a personal growth and career plan.</b></li> <li>c. Explain the relationship between sound financial habits and financial security.</li> <li>d. Create and manage a personal financial plan.</li> <li>e. Demonstrate initiative in achieving personal and professional goals.</li> <li>f. Apply time management strategies to meet deadlines.</li> <li>g. Demonstrate a growth mindset through flexibility and a positive attitude.</li> <li>h. Select and demonstrate appropriate job-search and retention techniques.</li> <li>i. Demonstrate strategies to prepare for employment.</li> <li>j. Demonstrate interpersonal skills appropriate for the workplace.</li> <li>k. Elaborate on the importance of perseverance to personal and professional success.</li> <li>l. Discover personal career interests, aptitudes, and skills.</li> </ul>  |                 | <a href="#">1</a><br><a href="#">2</a><br><a href="#">3</a><br><a href="#">4</a><br><a href="#">6</a>  | <a href="#">2</a><br><a href="#">3</a><br><a href="#">4</a><br><a href="#">7</a><br><a href="#">8</a><br><a href="#">11</a>                       | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">SLS</a><br><a href="#">9-10</a><br><a href="#">11-12.1</a><br><a href="#">11-12.1d</a><br><a href="#">11-12.2</a><br><br><a href="#">WS</a><br><a href="#">11-12.6</a> | <a href="#">1a</a><br><a href="#">3a,c</a><br><a href="#">4d</a><br><a href="#">6a,d</a><br><a href="#">7b</a> |
| <b>6. Workplace Safety and Personal Wellness</b>  | <b>CTE - PS</b> | <b>CRP</b>   | <b>CTE - AS</b>   | <b>CCSS</b>   | <b>ISTE</b>  |
| <ul style="list-style-type: none"> <li>a. <b>Demonstrate proper industry specific safe work practices to prevent injury or illness.</b></li> <li>b. <b>Assess the potential impact of goal setting on personal and professional success.</b></li> <li>c. Describe the role of security and emergency procedures in workplace safety.</li> <li>d. Describe the effect of preventative measures on emergencies in the workplace.</li> <li>e. Identify and describe the causes, prevention, and treatment of common accidents.</li> <li>f. Identify local, state, and federal agencies that regulate workplace safety.</li> <li>g. Explain the role of the California Occupational Safety and Health Administration (Cal-OSHA) and the Environmental Protection Agency (EPA).</li> <li>h. Discuss the basics of system operations.</li> <li>i. Demonstrate the proper use of personal protective equipment (PPE).</li> <li>j. Explain the purpose of and accurately interpret a Safety Data Sheet (SDS).</li> <li>k. Identify hazardous materials and chemicals.</li> <li>l. Demonstrate proper procedures to respond to work-related accidents and injuries.</li> <li>m. Describe how ergonomics, housekeeping, and maintenance are related to accidents and injuries.</li> </ul> |                 | <a href="#">2</a><br><a href="#">5</a><br><a href="#">6</a><br><a href="#">8</a><br><a href="#">12</a> | <a href="#">2</a><br><a href="#">5</a><br><a href="#">6</a><br><a href="#">7</a><br><a href="#">8</a><br><a href="#">10</a><br><a href="#">11</a> | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a><br><a href="#">11-12.6</a><br><br><a href="#">SLS</a><br><a href="#">9-10</a><br><a href="#">11-12.1</a><br><a href="#">11-12.1d</a> | <a href="#">1a,d</a><br><a href="#">2a,d</a><br><a href="#">5b</a>   |



| 9. Art, Design, and Color Theory  | CTE - PS  | CRP  | CTE - AS   | CCSS  | ISTE |
|---|---|--|--|---|------|
| <ul style="list-style-type: none"> <li>a. Describe and demonstrate elements and principles of design such as: balance, movement, space, emphasis, color, texture, and unity.</li> <li>b. Demonstrate the ability to reorganize and integrate visual art elements across digital media and design applications.</li> <li>c. Describe and demonstrate principles of design such as balance, movement, repetition, emphasis, contrast, and unity.</li> <li>d. Describe and demonstrate design elements such as distortion, color theory, arbitrary color, scale, expressive content, and real versus virtual.</li> <li>e. Identify examples of traditional and classic designs.</li> <li>f. Develop contemporary design examples using aesthetic theories to make social connections.</li> <li>g. Assess and describe the effect that colors and design principles have on audiences.</li> <li>h. Critique both personally animated artworks and that of others based on the elements of art and the principles of design.</li> <li>i. Develop a scene incorporating art history, architecture, and various periods of art.</li> </ul> | <a href="#">A1.0</a><br><a href="#">A1.8</a><br><a href="#">A2.6</a><br><a href="#">A2.8</a>      | <a href="#">1</a><br><a href="#">2</a><br><a href="#">5</a>                      | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">11</a>  | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a>                            |      |
| 10. Production Pipeline   | CTE - PS  | CRP  | CTE - AS   | CCSS  | ISTE |
| <ul style="list-style-type: none"> <li>a. Identify and explain the importance of basic production tools in managing a production.</li> <li>b. Demonstrate an understanding of the component steps and skills required to produce a 3D production.</li> <li>c. Compare and contrast the production pipeline of the entertainment, legal, and scientific industries.</li> <li>d. Identify and describe idea/story, script/screenplay, storyboards, animatic/pre-visualization, and design components of the pre-production phase.</li> <li>e. Explain the layout, research and development, modeling, rigging/setup, animation, 3D visual effects, and light/rendering components of production.</li> <li>f. Explain the compositing, 2D visual effects (VFX)/motion graphics, color correction, and final output components of post-production.</li> <li>g. Describe the basic tools of production such as the production bible, production triangle, Gantt and PERT charts, production charts, and software.</li> <li>h. Identify and explain the purpose of asset tracking sheets.</li> </ul>                                      | <a href="#">A1.0</a><br><a href="#">A2.1</a><br><a href="#">A2.3</a><br><a href="#">A2.9 A8.1</a> | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a> | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">10</a><br><a href="#">11</a> | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a><br><a href="#">11-12.6</a><br><a href="#">11-12.7</a> |      |
| 11. Introduction to Storyboarding   | CTE - PS  | CRP  | CTE - AS   | CCSS  | ISTE |
| <ul style="list-style-type: none"> <li>a. Demonstrate the animation process utilizing a storyboard.</li> <li>b. Explain the importance of using storyboards in 3D animation productions.</li> <li>c. Demonstrate the principles and elements of art in all aspects of creating a storyboard.</li> <li>d. Develop a storyboard to present a project idea.</li> <li>e. Identify scenes for animation and map out those scenes.</li> </ul>   | <a href="#">A1.0</a>  | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a> | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">11</a>                       | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a>   |      |

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| f. Demonstrate how to modify and map out a storyboard with changes.<br>g. Compare and contrast storyboards and animatics.  |  |  |  | <a href="#">11-12.6</a><br><a href="#">11-12.7</a>  |             |
| <b>12. Introduction to 3D Animation Software, Hardware, and Tools</b>  | <b>CTE - PS</b>  | <b>CRP</b>   | <b>CTE - AS</b>  | <b>CCSS</b>   | <b>ISTE</b> |
| a. <b>Competently demonstrate the use of 3D animation software and hardware.</b><br>b. <b>Identify and explain software and hardware requirements for 3D animation.</b><br>c. Describe the characteristics of hardware and software appropriate for 3D animation.<br>d. Identify 3D animation computer component upgrades.<br>e. Compare and contrast tablets and 3D scanning input devices.<br>f. Create scenes utilizing a 3D comprehensive software animation package tutorial.   | <a href="#">A8.0</a>   | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">10</a><br><a href="#">11</a> | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">10</a><br><a href="#">11</a> | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a><br><a href="#">11-12.6</a> |             |
| <b>13. Introduction to Modeling</b>  | <b>CTE - PS</b>  | <b>CRP</b>   | <b>CTE - AS</b>  | <b>CCSS</b>   | <b>ISTE</b> |
| a. <b>Demonstrate competency in creating 3D models.</b><br>b. <b>Demonstrate the manipulation of models from reference models, 3D scanners, digital sculptures, and geometric shapes.</b><br>c. Define and appropriately use virtual 3-D modeling terminology.<br>d. Describe the historical use of modeling clay for animated work.<br>e. Demonstrate how to manipulate polygon vertices, edges, and faces.<br>f. Describe and demonstrate nurb surfaces (making faces with nodes).<br>g. Describe and demonstrate surfacing and noise.<br>h. Use the principles and elements of art in all aspects of modeling.<br>i. Describe and demonstrate the primitive tools of modeling and multiple modeling views.<br>j. Demonstrate dividing, smoothing, extruding, beveling, deleting, combining, and separating operations on polygons.<br>k. Develop a scene with three primitives, such as a cube, cylinder, and spheres.<br>l. Adjust the view for realism. | <a href="#">A2.1</a><br><a href="#">A2.6</a> <a href="#">A2.9</a><br><a href="#">A3.0</a> <a href="#">A4.6</a> | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">10</a>                       | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">10</a><br><a href="#">11</a> | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a><br><a href="#">11-12.6</a> |             |
| <b>14. Texturing</b>   | <b>CTE - PS</b>  | <b>CRP</b>   | <b>CTE - AS</b>  | <b>CCSS</b>   | <b>ISTE</b> |
| a. <b>Accurately explain 3D texturing.</b><br>b. <b>Demonstrate proficiency using the texture editor.</b><br>c. <b>Demonstrate texturing techniques with lectures and layers.</b><br>d. Use the principles and elements of art in all aspects of modeling.<br>e. Create textures and layers using 2D design software.<br>f. Transfer 2D textures and layers to 3D applications.<br>g. Set up and describe attributes of the shader (i.e., material or surface) applied to a 3D model.<br>h. Explain and apply texture maps to models.  | <a href="#">A2.6</a>   | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">10</a>                       | <a href="#">1</a><br><a href="#">2</a><br><a href="#">4</a><br><a href="#">5</a><br><a href="#">10</a><br><a href="#">11</a> | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a><br><a href="#">11-12.6</a> |             |

| 15. Animation  | CTE - PS             | CRP   | CTE - AS   | CCSS  | ISTE |
|--|----------------------|---|--|---|------|
| <ul style="list-style-type: none"> <li>a. <b>Demonstrate competency with object animation, lighting, camera views, and rendering.</b></li> <li>b. <b>Create a complete 3D animation from storyboard to character creation, from set design to final production.</b></li> <li>c. Use the principles and elements of art in all aspects of animation.</li> <li>d. Animate objects in 3D.</li> <li>e. Perform basic keyframing.</li> <li>f. Demonstrate the 12 principles of animation.</li> <li>g. Demonstrate the ability to add lights and camera views.</li> <li>h. Animate a character in a simple walk cycle and running motion.</li> <li>i. Add facial and body expression to a character using bone animation.</li> <li>j. Describe and demonstrate camera views and switching for angles.</li> </ul> | <a href="#">A2.6</a> | <u>1</u><br><u>2</u><br><u>4</u><br><u>5</u><br><u>10</u> | <u>1</u><br><u>2</u><br><u>4</u><br><u>5</u><br><u>10</u><br><u>11</u> | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a><br><a href="#">11-12.6</a> |      |
| 16. Visual Effects   | CTE - PS             | CRP   | CTE - AS   | CCSS  | ISTE |
| <ul style="list-style-type: none"> <li>a. <b>Identify specialized areas of 3D visual effects.</b></li> <li>b. <b>Describe and demonstrate techniques used to create visual effects.</b></li> <li>c. Use the principles and elements of art in all aspects of visual effects.</li> <li>d. Describe and demonstrate concepts of visual effects such as a starfield.</li> <li>e. Identify and discuss computer requirements for rendering visual effects.</li> <li>f. Create smoke and fire visual effects.</li> <li>g. Create flowing water visual effects.</li> </ul>   | <a href="#">A2.6</a> | <u>1</u><br><u>2</u><br><u>4</u><br><u>5</u><br><u>10</u> | <u>1</u><br><u>2</u><br><u>4</u><br><u>5</u><br><u>10</u><br><u>11</u> | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a><br><a href="#">11-12.6</a> |      |
| 17. Advanced Rendering   | CTE - PS             | CRP   | CTE - AS   | CCSS  | ISTE |
| <ul style="list-style-type: none"> <li>a. <b>Explain and demonstrate different types and techniques for rendering models and scenes.</b></li> <li>b. <b>Render and complete a 3D animation project.</b></li> <li>c. Use the principles and elements of art in all aspects of rendering models and scenes.</li> <li>d. Compare, contrast, and demonstrate scanline and raytracing rendering.</li> <li>e. Use global illumination algorithms to create realistic lighting and shaders.</li> <li>f. Describe and demonstrate different types of raytracing and refracting.</li> <li>g. Describe and demonstrate different types of shadowing techniques.</li> </ul>   | <a href="#">A2.6</a> | <u>1</u><br><u>2</u><br><u>4</u><br><u>5</u><br><u>10</u> | <u>1</u><br><u>2</u><br><u>4</u><br><u>5</u><br><u>10</u><br><u>11</u> | <a href="#">LS</a><br><a href="#">9-10</a><br><a href="#">11-12.6</a><br><br><a href="#">WS</a><br><a href="#">11-12.7</a><br><a href="#">11-12.6</a> |      |

## Standards Alignment

The curricula have been aligned with the CTE Model Curriculum Standards released in 2013. Each industry sector was updated to meet the increased rigor and relevancy requirements of the Common Core State Standards. The curriculum also includes the new Standards for Career Ready Practices.

### Standards for Career Ready Practice

1. *Apply appropriate technical skills and academic knowledge.*
2. *Communicate clearly, effectively, and with reason.*
3. *Develop an education and career plan aligned with personal goals.*
4. *Apply technology to enhance productivity.*
5. *Utilize critical thinking to make sense of problems and persevere in solving them.*
6. *Practice personal health and understand financial literacy.*
7. *Act as a responsible citizen in the workplace and the community.*
8. *Model integrity, ethical leadership, and effective management.*
9. *Work productively in teams while integrating cultural and global competence.*
10. *Demonstrate creativity and innovation.*
11. *Employ valid and reliable research strategies.*
12. *Understand the environmental, social, and economic impacts of decisions.*

## CTE Anchor Standards—Common Core English Language Arts Alignment

### *Anchor Standard 1: Academics*

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to post-secondary education and employment. Refer to the industry sector alignment matrix for identification of standards. Note: alignment listed within each sector.

### *Anchor Standard 2: Communications*

Language Standard: Acquire and accurately use general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the (career and college) readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. LS 9-10, 11-12.6

### *Anchor Standard 3: Career Planning and Management*

Speaking and Listening Standard: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. SLS 11-12.2

### *Anchor Standard 4: Technology*

Writing Standard: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments and information.

### *Anchor Standard 5: Problem Solving and Critical Thinking*

Writing Standard: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem, narrow or broaden the inquiry when appropriate, and synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. WS 11-12.7

### *Anchor Standard 6: Health and Safety*

Reading Standards for Science and Technical Subjects: Determine the meaning of symbols, keywords, and other domain-specific words and phrases as they are used in a specific scientific or technical context. RSTS 9-10, 11-12.4

### *Anchor Standard 7: Responsibility and Flexibility*

Speaking and Listening Standard: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners, building on others' ideas and expressing their own clearly and persuasively. SLS 9-10, 11-12.1

### *Anchor Standard 8: Ethics and Legal Responsibilities*

Speaking and Listening Standard: Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the work. SLS 11-12.1d

### *Anchor Standard 9: Leadership and Teamwork*

Speaking and Listening Standard: Work with peers to promote civil, democratic discussions and decision making; set clear goals and deadlines; and establish individual roles as needed. SLS 11-12.1b

### *Anchor Standard 10: Technical Knowledge and Skills*

Writing Standard: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. WS 11-12.6

### *Anchor Standard 11: Demonstration and Application*

Demonstrate and apply the knowledge and skills contained in the industry-sector anchor standards, pathway standards, and performance indicators in the classroom, laboratory, and workplace settings, and the career technical student organization. Note: no alignment evident for this standard. WS 11-12.6

## CTE Model Curriculum Standards—Industry Sectors and Pathways

### *Arts, Media, and Entertainment*

#### *A. Design, Visual, and Media Arts Pathway*

- A1.0 *Demonstrate ability to reorganize and integrate visual art elements across digital media and design applications.*
- A1.1 *View and respond to a variety of industry-related artistic products integrating industry appropriate vocabulary.*
- A1.2 *Identify and use the principles of design to discuss, analyze, and create projects and products across multiple industry applications.*
- A1.8 *Compare how distortion is used in a variety of media to modify the message being communicated.*
- A2.1 *Demonstrate skill in the manipulation of digital imagery (either still or video) in an industry-relevant application.*
- A2.3 *Apply refined observation and drawing skills to solve an industry-relevant problem.*
- A2.6 *Create an artistic product that involves the effective use of the elements of art and the principles of design.*
- A2.9 *Create a multimedia work of art that demonstrates knowledge of media and technology skills.*
- A3.0 *Analyze and assess the impact of history and culture on the development of professional arts and media products.*
- A4.6 *Create an artistic product for a specific industry and modify that product to accommodate a different aesthetic perspective.*
- A8.0 *Understand the key technical and technological requirements applicable to various segments of the Media and Design Arts Pathway.*
- A8.1 *Understand the component steps and skills required to design, edit, and produce a production for audio, video, electronic, or printed presentation.*

## ISTE Standards for Students

**1. Empowered Learner-** Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.

- a) Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them, and reflect on the learning process itself to improve learning outcomes.
- b) Students build networks and customize their learning environments in ways that support the learning process.
- c) Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways
- d) Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

**2. Digital Citizen-** Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world, and they act and model in ways that are safe, legal, and ethical.

- a) Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.
- b) Students engage in positive, safe, legal, and ethical behavior when using technology, including social interactions online or when using networked devices.
- c) Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.
- d) Students manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.

**3. Knowledge Constructor-** Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts, and make meaningful learning experiences for themselves and others.

- a) Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
- b) Students evaluate the accuracy, perspective, credibility, and relevance of information, media, data, or other resources.
- c) Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
- d) Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.

**4. Innovative Designer-** Students use a variety of technologies within a design process to identify and solve problems creating new, useful, or imaginative solutions.

- a) Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems.
- b) Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
- c) Students develop, test, and refine prototypes as part of a cyclical design process.
- d) Students exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.

**5. Computational Thinker-** Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

- a) Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.
- b) Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.

*c) Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.*

*d) Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.*

**6. Creative Communicator-** *Students communicate clearly and express themselves creatively for a variety of purposes using platforms, tools, styles, formats, and digital media appropriate for their goals.*

*a) Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.*

*b) Students create original works or responsibly repurpose or remix digital resources into new creations.*

*c) Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models, or simulations.*

*d) Students publish or present content that customizes the message and medium for their intended audiences.*

**7. Global Collaborator-** *Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.*

*a) Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.*

*b) Students use collaborative technologies to work with others, including peers, experts, or community members, to examine issues and problems from multiple viewpoints.*

*c) Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.*

*d) Students explore local and global issues and use collaborative technologies to work with others to investigate solutions.*