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PROGRAM CONCENTRATION: Business & Computer Science
CAREER PATHWAY: Interactive Media
COURSE TITLE: Introduction to Animation and 3d Design

Introduction to Animation and 3d Design is a foundations course that serves as an introduction to the animation and 3d design industry. Emphasis is placed on career awareness, fundamentals of modeling, storyboard creation, cameras and lighting. Students will learn how 3d technology is used for film, broadcast and games and how it is rapidly becoming the medium of choice for industrial design, military simulations, and medical visualization. The standards are aligned with the interactive media standards in Georgia's technical colleges, thus helping to qualify students for advanced placement should they continue their education at the postsecondary level. Competencies for the co-curricular student organization, Future Business Leaders of America (FBLA), are integral components of both the core employability skills standards and the technical skills standards, and FBLA activities should be incorporated throughout instructional strategies developed for the course.

CAREER DEVELOPMENT

BCS-IAD-1. Students will investigate career opportunities, trends, and requirements related to 3d graphics and animation careers.

- a. Compare and contrast 3d graphics and animation careers.
- b. Investigate trends associated with 3d graphics and animation careers.
- c. Develop a realistic Student Education Occupation Plan (SEOP) to help guide further educational pursuits.
- d. Explain the importance of meeting deadlines.
- e. Demonstrate the ability to cooperate in a team environment.
- f. Explore how various fields use 3d graphics and animation (i.e. entertainment, health science, aerospace).

Academic Standards:

ELA12W2. The student demonstrates competence in a variety of genres.

ELA12W3. The student uses research and technology to support writing.

ELA12RC3. The student acquires new vocabulary in each content area and uses it correctly.

ELA12RC4. The student establishes a context for information acquired by reading across subject areas.

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ELA12LSV1. The student participates in student-to-teacher, student-to-student, and group verbal interactions.

Sample Tasks:

- Research a career that involves 3d graphics and animation at http://www3.ccps.virginia.edu/career_prospects/briefs/T-Z/Visualization.shtml, <http://www.animationschoolreview.com/sketches/2005/02/3d-animation-the-future-has-arrived.html>, <http://www.animationarena.com/animation-career.html> and present to the class. Include information on salaries, sample tasks and what preparation is needed.
- Research the development of 3d graphics at <http://computer.howstuffworks.com/3dgraphics.htm> and give a presentation to the class.

STORYBOARD FUNDAMENTALS

BCS-IAD-2. Students will demonstrate design skills needed to formally document project goals in order to focus development efforts.

- a. Describe the purpose of the 3d graphics and/or animation including the target audience.
- b. List the objects.
- c. Apply brainstorming techniques to focus development efforts.
- d. Create scene-by-scene illustrations.
- e. Outline and link action sequences.

Academic Standards:

ELA12W2. The student demonstrates competence in a variety of genres.

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ELA12W3. The student uses research and technology to support writing.

ELA12RL4. The student employs a variety of writing genres to demonstrate a comprehensive grasp of significant ideas in sophisticated literary works. The student composes essays, narratives, poems, or technical documents.

ELA12RC3. The student acquires new vocabulary in each content area and uses it correctly.

ELA12RC4. The student establishes a context for information acquired by reading across subject areas.

ELA12LSV1. The student participates in student-to-teacher, student-to-student, and group verbal interactions.

Sample Tasks:

- Conduct a sample survey of the number of students who drink milk at your local school. In a group setting, work together to formulate a plan on how to improve student consumption of milk.
- Create a storyboard from rough sketches to finished product advertising the importance of drinking milk.

3d ANIMATION SKILLS

BCS-IAD-3. Students will demonstrate knowledge of Animation Software UI and General Features.

- a. Effectively use menu bars, command panels, and software navigation tools.
- b. Demonstrate the ability to map between the various coordinate systems.
- c. Compare and contrast use of Orthographic/Perspective Views.
- d. Demonstrate the ability to select objects and sub objects.
- e. Use positional transformations.

Academic Standard:

ELA12RC3. The student acquires new vocabulary in each content area and uses it correctly.

BCS-IAD-4. Students will demonstrate knowledge of construction of 2d and 3d modeling.

- a. Create standard, extended and architectural primitives.
- b. Modify object properties.

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- c. Transform and clone objects.
- d. Create and use object arrays.
- e. Build compound objects.
- f. Construct spline objects.

Academic Standards:

MM2P4. Students will make connections among mathematical ideas and to other disciplines.

MM1P3. Students will communicate mathematically.

MM1P5. Student will represent mathematics in multiple ways.

MM2G3. Students will understand the properties of circles.

MM2G4. Students will find and compare the measures of spheres.

MM3G3. Students will investigate planes and spheres.

MM3G1. Students will investigate the relationships between lines and circles.

ELA12RC3. The student acquires new vocabulary in each content area and uses it correctly.

BCS-IAD-5. Students will demonstrate knowledge of methods used to modify 3d models.

- a. Employ techniques to extrude a 2d object into a 3d object.
- b. Apply modifiers that will rotate a spline to create a circular cross section.
- c. Employ various techniques to modify edges, faces and vertices.
- d. Convert objects to Editable Mesh, Poly, Patch and Nurbs.

Academic Standards:

MM1G1. Students will investigate properties of geometric figures in the coordinate plane.

MM3G1. Students will investigate the relationships between lines and circles.

ELA12RC3. The student acquires new vocabulary in each content area and uses it correctly.

ELA12W2 The student demonstrates competence in a variety of genres.

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APPLYING MATERIALS & MAPS

BCS-IAD-6. Students will demonstrate the ability to specify color materials properly.

- a. Specify the ambient and diffused color of an object.
- b. Specify the specular, reflective, and luminosity material properties of objects.
- c. Add filters to an object.

Academic Standards:

MM2P4. Students will make connections among mathematical ideas and to other disciplines.

MM1P3. Students will communicate mathematically.

MM1P5. Student will represent mathematics in multiple ways.

SP4. Students will analyze the properties and applications of waves.

BCS-IAD-7. Students will demonstrate the ability to create various surface materials.

- a. Create various surface patterns such as smoke, tiles, and swirls.
- b. Compare and contrast techniques for simulating land and water.
- c. Create reflections and refractions on objects.
- d. Compare, contrast and use opacity versus transparency.

Academic Standards:

MM2P4. Students will make connections among mathematical ideas and to other disciplines.

MM1P3. Students will communicate mathematically.

MM1P5. Student will represent mathematics in multiple ways.

SP4. Students will analyze the properties and applications of waves.

BCS-IAD-8. Students will demonstrate the ability to manipulate images by adding material maps.

- a. Create maps that will wrap an image onto an object.
- b. Create maps that will modify the surface of an object.
- c. Apply environmental maps for modifying background images.

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Academic Standard:

SES3. Students will explore the actions of water, wind, and gravity that create landforms and systems of landforms.

LIGHTING TECHNIQUES

BCS-IAD-9. Students will demonstrate effective use of lights on 2d/3d objects.

- a. Compare and contrast natural light versus artificial light.
- b. Describe and use three-point lighting.
- c. Apply principles of basic color theory to lighting.
- d. Employ various lighting types.
- e. Identify key principles in effective lighting.

Academic Standards:

MM1P5. Student will represent mathematics in multiple ways.

SP4. Students will analyze the properties and applications of waves.

CAMERA TECHNIQUES

BCS-IAD-10. Students will demonstrate knowledge of setting and modifying camera views.

- a. Compare and contrast the difference between a free and a target camera.
- b. Calculate and change camera's focal length.
- c. Describe the impact of depth of field on an object.
- d. Describe and apply the use of motion blur on an object.
- e. Apply techniques to create shadows.

Academic Standard:

ELA12W2. The student demonstrates competence in a variety of genres.

ANIMATION RENDERING

BCS-IAD -11. Students will demonstrate knowledge of manipulating frame rate, speed, and direction.

- a. Use animation position controllers.

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- b. Set key frames manually.

Academic Standard:

ELA12W2. The student demonstrates competence in a variety of genres.

BCS-IAD -12. Students will develop the ability to manipulate an object's trajectory.

- a. Create various object paths.
- b. Ghost an object's trajectory.

Academic Standards:

MM1A3. Students will solve simple equations.

MM1P1. Students will solve problems using appropriate technology.

MM1P4. Students will make connections among mathematical ideas and to other disciplines.

BCS-IAD -13. Students will demonstrate the ability to create rendering effects.

- a. Create various atmospheric conditions such as fire and fog.
- b. Create advanced particles such as snow or rain drops.

Academic Standards:

SCSH3. Students will identify and investigate problems scientifically.

SES3. Students will explore the actions of water, wind, and gravity that create landforms and systems of landforms.

CTAE Foundation Skills

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U. S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical

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Education Consortium (NASDCTEc), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and post secondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

CTAE-FS-1 Technical Skills: Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

CTAE-FS-2 Academic Foundations: Learners achieve state academic standards at or above grade level.

CTAE-FS-3 Communications: Learners use various communication skills in expressing and interpreting information.

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

CTAE-FS-5 Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-6 Systems: Learners understand a variety of organizational structures and functions.

CTAE-FS-7 Safety, Health and Environment: Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

CTAE-FS-8 Leadership and Teamwork: Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

CTAE-FS-9 Ethics and Legal Responsibilities: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

CTAE-FS-10 Career Development: Learners plan and manage academic-career plans and employment relations.

CTAE-FS-11 Entrepreneurship: Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.