Florida Department of Education
Curriculum Framework

Program Title: **Game/Simulation/Animation Visual Design**
Program Type: **Career Preparatory**
Career Cluster: **Information Technology**

Secondary – Career Preparatory	
Program Number	8208100
CIP Number	0550041114
Grade Level	9-12
Standard Length	4 credits
Teacher Certification	Refer to the **Program Structure** section.
CTSO	FBLA BPA
SOC Codes (all applicable)	15-1199 – Computer Occupations, All Other 27-1014 – Multimedia Artists and Animators
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This program offers a sequence of project-based courses that provide coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Information Technology career cluster such as Game or Simulation Designer, Game or Simulation Graphic Artist, and Game or Simulation 3-D Animator; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Information Technology career cluster.

The content includes but is not limited to practical experiences in game/simulation conceptualization, design, storyboarding, development methodologies, 2D/3D animation design and production, and implementation issues. Specialized skills involving graphic animation software are used to produce a variety of two and three dimensional components.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points.

To teach the courses listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Teacher Certification	Length	SOC Code	Level	Graduation Requirement
A	8207310	Digital Information Technology **OR**	DIT Teacher Certifications	1 credit	15-1199	2	PA
	8208110	Game & Simulation Foundations	BUS ED 1 @2 COMPU SCI 6 COMM ART @7 7G TV PRO TEC @7 7G DIGI MEDIA 7G COMP PROG 7G	1 credit		2	PA
	8208120	Game & Simulation Design		1 credit		2	PA
B	8208130	Game & Simulation Graphic Artist		1 credit	27-1014	2	PA
C	8208140	Game & Simulation 3D Animator		1 credit	27-1014	2	PA

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science 1	Marine Science 1 Honors	Physical Science	Physics 1
8207310	5/87 6%	5/80 6%	24/83 29%	5/69 7%	24/67 36%	5/70 7%	5/69 7%	24/82 29%	5/66 8%	24/74 32%	5/72 7%
8208110	1/87 1%	14/80 18%	23/83 28%	9/69 13%	28/67 42%	6/70 9%	2/69 3%	28/82 34%	9/66 14%	34/74 46%	16/72 22%
8208120	6/87 7%	18/80 23%	27/83 33%	13/69 19%	31/67 46%	13/70 19%	6/69 9%	31/82 38%	12/66 18%	41/74 55%	20/72 28%
8208130	20/87 23%	21/80 26%	1/83 1%	20/69 29%	2/67 3%	20/70 29%	20/69 29%	1/82 1%	15/66 23%	2/74 3%	21/72 29%
8208140	20/87 23%	21/80 26%	1/83 1%	20/69 29%	2/67 3%	20/70 29%	20/69 29%	1/82 1%	15/66 23%	2/74 3%	21/72 29%

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Courses	Algebra 1	Algebra 2	Geom etry	English 1	English 2	English 3	English 4
8207310	20/67 30%	15/75 20%	18/54 33%	40/46 87%	40/45 89%	40/45 89%	40/45 89%
8208110	14/67 21%	9/75 12%	13/54 24%	#	#	#	#
8208120	16/67 24%	11/75 15%	17/54 31%	7/46 15%	7/45 16%	7/45 16%	7/45 16%
8208130	11/67 16%	14/75 19%	11/54 20%	#	#	#	#
8208140	8/67 12%	14/75 19%	10/54 19%	#	#	#	#

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Program Recommendations

The Game, Simulation and Animation Visual Design program lends itself to integration of the core academic subjects of language arts, math, science, visual arts, and social studies into project activities. It is through a balanced and integrated curriculum that students attain the attitudes, skills, and knowledge needed to compete successfully in today's work force. To achieve total curriculum integration, academic and career and technical education teachers should be scheduled with common planning times.

This program emphasizes the development of technical abilities as well as ethical and societal awareness necessary to function in a highly technological society. The use of cooperative learning groups is recommended. By learning and practicing group process skills, students will be prepared to work "together" in real work situations. Program graduates will develop enhanced self-esteem as well as the problem solving and teamwork skills necessary to succeed in careers and postsecondary education.

The Game, Simulation & Animation Visual Design program places a strong emphasis on workplace learning. Job shadowing and mentoring experiences with game and simulation professionals along with on-site trips to local businesses connect classroom learning to the workplace. In-class guest speakers bring the real world into the classroom.

The Foundations and Design courses should be taken in sequence prior to the 2D Graphic Development and 3D Graphic Animation courses. The 2D Graphic Development and 3D Graphic Animation courses may be taken concurrently. Digital Information Technology may be taken concurrently with either the Foundations course or the Design course.

The Game/Simulation/Animation Advanced Applications program (8208400) is an appropriate follow-on capstone program.

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that

educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program. To access these standards, please click on the following link:
http://www.fldoe.org/core/fileparse.php/5652/urlt/FloridaStandardsTechSubjects.rtf.

Florida Standards for English Language Development (ELD)
English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:
Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link: http://www.cpalms.org/uploads/docs/standards/eld/SI.pdf.
For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

Digital Information Technology (8207310) is the first course in this and other programs within the Information Technology Career Cluster. Standards 01.0 – 14.0 are associated with this course.

After successfully completing this program, the student will be able to perform the following:

01.0 Demonstrate knowledge, skill, and application of information systems to accomplish job objectives and enhance workplace performance.
02.0 Develop an awareness of microprocessors and digital computers.
03.0 Demonstrate an understanding of operating systems.
04.0 Use technology to enhance the effectiveness of communication skills utilizing word processing applications.
05.0 Use technology to enhance communication skills utilizing presentation applications.
06.0 Use technology to enhance the effectiveness of communication utilizing spreadsheet and database applications.
07.0 Use technology to enhance communication skills utilizing electronic mail.
08.0 Investigate individual assessment and job/career exploration and individual career planning that reflect the transition from school to work, lifelong learning, and personal and professional goals.
09.0 Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance.
10.0 Demonstrate competence using computer networks, internet and online databases to facilitate collaborative or individual learning and communication.
11.0 Demonstrate competence in page design applicable to the WWW.
12.0 Develop an awareness of emerging technologies.
13.0 Develop awareness of computer languages and software applications.
14.0 Demonstrate comprehension and communication skills.
15.0 Identify commonly used art and animation production tools in the game design industry.
16.0 Understand intellectual property rights, copyright laws and plagiarism as it applies to creative assets.
17.0 Explain the importance of employability skill and entrepreneurship skills as it relates to game/simulation development.
18.0 Identify tools and software commonly used in game development.
19.0 Investigate career opportunities in the game industry.
20.0 Demonstrate research and information fluency.
21.0 Demonstrate an understanding of the techniques used to evaluate game mechanics, game play, flow, and game design.
22.0 Explore the methods used to create and sustain player immersion.
23.0 Describe the game development life cycle.
24.0 Demonstrate the professional level of written and oral communication required in the game development industry.
25.0 Understand the core tasks and challenges that face a video game design team.
26.0 Demonstrate leadership and teamwork skills needed, as it relates to game/simulation development, to accomplish team goals and objectives.
27.0 Create a working game or simulation as part of a team.
28.0 Create a game design production plan that describes the game play, outcomes, controls, interface and artistic style of a video game.
29.0 Categorize the different gaming genres.
30.0 Identify popular games and identify commonality between them.

31.0 Understand the general procedure and requirements of game design.
32.0 Understand the general principles of storytelling for game design.
33.0 Understand character archetypes and character design.
34.0 Develop a game design document.
35.0 Understand the process of creating and designing player choice and other game designer strategy considerations.
36.0 Create and design the game flow as it relates to story and plot.
37.0 Assess common principles and procedures in game flow design.
38.0 Describe player challenge rule creation elements.
39.0 Understand the use of inventory systems in game design.
40.0 Understand the various job titles and responsibilities of a graphic artist as it relates to the game industry.
41.0 Develop the art direction for a game.
42.0 Determine and document the graphical needs of a game using design documents including art direction and reference materials.
43.0 Understand the fundamentals of drawing and painting techniques.
44.0 Demonstrate a working knowledge of vector and paint programs used to make graphics.
45.0 Demonstrate the effective use art input devices.
46.0 Demonstrate world building, making graphics and backgrounds for side scrolling, top down, and Isometric projection.
47.0 Understand the general concepts of environmental design.
48.0 Describe how environmental design is used in conjunction with game level design.
49.0 Demonstrate knowledge of basic lighting.
50.0 Demonstrate knowledge of basic materials and textures.
51.0 Demonstrate basic understanding of modeling principles.
52.0 Demonstrate knowledge of polygon modeling.
53.0 Demonstrate knowledge of non-uniform rational b-splines (NURBS) modeling.
54.0 Demonstrate advance texturing techniques.
55.0 Understand the various job titles and responsibilities of a 3D animator as it relates to the game industry.
56.0 Understand the principles of 2D and 3D animation as it relates to game graphics (walk, run, Jump, idle).
57.0 Demonstrate a working knowledge of modeling and paint programs used to make 3D graphics and animation.
58.0 Demonstrate knowledge of basic animation.
59.0 Demonstrate knowledge of rigging.
60.0 Understand the fundamentals of facial animation.
61.0 Create a user interface.
62.0 Individually design and create a playable game.
63.0 Create particle system effects.
64.0 Individually design and create a playable game.

Florida Department of Education
Student Performance Standards

Course Title: **Digital Information Technology**
Course Number: **8207310**
Course Credit: **1**

Course Description:

This course is designed to provide a basic overview of current business and information systems and trends, and to introduce students to fundamental skills required for today's business and academic environments. Emphasis is placed on developing fundamental computer skills. The intention of this course is to prepare students to be successful both personally and professionally in an information based society. Digital Information Technology includes the exploration and use of: databases, the internet, spreadsheets, presentation applications, management of personal information and email, word processing and document manipulation, HTML, web page design, and the integration of these programs using software that meets industry standards. After successful completion of this core course, students will have met Occupational Completion Point A, Information Technology Assistant - SOC Code 15-1151.

Digital Information Technology (8207310) is part of several programs across the various CTE career clusters. To ensure consistency, the standards and benchmarks for this course (01.0 – 14.0) have been placed in a separate document. To access this document, visit: Digital Information Technology (8207310).

Florida Department of Education
Student Performance Standards

Course Title: **Game & Simulation Foundations**
Course Number: **8208110**
Course Credit: **1**

Course Description:

This course is designed to provide an introduction to game and simulation concepts and careers, the impact game and simulation has on society and industry, and basic game/simulation design concepts such as rule design, play mechanics, and media integration. This course compares and contrasts games and simulations, key development methodologies and tools, careers, and industry-related information. This course also covers strategies, processes, and methods for conceptualizing a game or simulation application; storyboarding techniques; and development tools.

Hands-on activities using an entry-level game development tool should be integrated into the curriculum.

Game & Simulation Creation

Instruction relating to the standards in this section should be interspersed throughout the entire course with the other standards taught progressively in the context of game design and development.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
15.0	Identify commonly used art and animation production tools in the game design industry. – The student will be able to:		
15.01	Identify, categorize and discuss art and animation tools commonly used in game design.		
16.0	Understand intellectual property rights, copyright laws and plagiarism as it applies to creative assets. – The student will be able to:		
16.01	Understand the use of “Fair Use and Fair Dealing”.		
16.02	Understand the transfer and licensing of creative works.		
16.03	Understand the use of “exclusive rights” to intellectual creations.		
16.04	Demonstrate the use of digital watermarking.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
17.0	Explain the importance of employability skill and entrepreneurship skills as it relates to game/simulation development. – The student will be able to:		
17.01	Identify and demonstrate positive work behaviors needed to be employable.		
17.02	Maintain a career portfolio to document knowledge, skills, and experience.		SC.912.N.1.1
17.03	Evaluate and compare employment opportunities that match career goals.		SC.912.N.1.1
17.04	Identify and exhibit traits for retaining employment.		SC.912.N.1.1
18.0	Identify tools and software commonly used in game development. – The student will be able to:		
18.01	Identify and discuss the popular game development tools currently used in the industry.		
18.02	Identify and discuss popular gaming engines.		
18.03	Identify and discuss popular world building tools.		
19.0	Investigate career opportunities in the game industry. – The student will be able to:		SC.912.N.4.2
19.01	Describe job requirements for a variety of occupations within the game development industry.		
19.02	Identify current employment trends and career opportunities in the game industry.		
20.0	Demonstrate research and information fluency. – The student will be able to:		
20.01	Play games to research and collect game play data.		
20.02	Evaluate, analyze and document game styles and playability.		
20.03	Determine the dramatic elements in games, including kinds of fun, player types and nonlinear storytelling.		
21.0	Demonstrate an understanding of the techniques used to evaluate game mechanics, game play, flow, and game design. – The student will be able to:		
21.01	Test and analyze games to determine the quality of rules, interfaces, navigation, performance, play, artistry and longevity in design and structure.		SC.912.N.1.1
21.02	Research and evaluate the game analysis techniques used by the video game industry.		SC.912.N.1.1
21.03	Identify the key elements in a game and make intelligent judgments about whether the game succeeded or failed in its objectives.		SC.912.N.1.1
21.04	Evaluate professional reviews and write a critical analysis of a current video game.		SC.912.N.1.1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
22.0	Explore the methods used to create and sustain player immersion. – The student will be able to:		
22.01	Research and define the term “player immersion”.		
22.02	Explore and explain the factors that create player immersion in a game.		
22.03	Examine popular games and explain the methods each game uses to increase player immersion.		
23.0	Describe the game development life cycle. – The student will be able to:		SC.912.P.10.13; 10.14; 10.15; 10.18
23.01	Identify steps in the pre-production process including the proof of concept and market research.		
23.02	Describe the iterative prototyping process – Alpha, Beta, RTM.		
23.03	Determine platform, technology and scripting requirements.		
23.04	Implement techniques of scenario development, levels, and missions.		
23.05	Discuss game testing requirements and methods.		SC.912.N.1.1
23.06	Identify and describe maintenance, upgrade and sequel issues.		
24.0	Demonstrate the professional level of written and oral communication required in the game development industry. – The student will be able to:		SC.912.N.1.1
24.01	Use listening, speaking, telecommunication and nonverbal skills and strategies to communicate effectively with supervisors, co-workers, and customers.		SC.912.N.1.1
24.02	Organize ideas and communicate oral and written messages appropriate for the game development industry environment.		SC.912.N.1.1
25.0	Understand the core tasks and challenges that face a video game design team. – The student will be able to:		SC.912.N.1.1
25.01	Identify and define the roles and responsibilities of team members on a video game design team.		SC.912.L.14.2
25.02	Explore and discuss methods of communications and scheduling for design teams.		
26.0	Demonstrate leadership and teamwork skills needed, as it relates to game/simulation development, to accomplish team goals and objectives. – The student will be able to:		
26.01	Employ leadership skills to accomplish organizational goals and objectives.		
26.02	Establish and maintain effective working relationships with others in order to accomplish objectives and tasks.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
26.03 Conduct and participate in meetings to accomplish work tasks.		
26.04 Employ mentoring skills to inspire and teach others.		

Florida Department of Education
Student Performance Standards

Course Title: **Game & Simulation Design**
Course Number: **8208120**
Course Credit: **1**

Course Description:

This course covers fundamental principles of designing a game or a simulation application, rules and strategies of play, conditional branching, design and development constraints, use of sound and animation, design tools, and implementation issues. The content includes market research, product design documentation, storyboarding, proposal development, and presentation of a project report. Emphasis is placed on the techniques needed to develop well-documented, structured game or simulation programs. Extensive use is made of evaluating and analyzing existing games or simulations.

Hands-on activities using an entry-level game development tool should be integrated into the curriculum. **Regardless of topic sequencing, the culminating activity is the creation and presentation of a playable game with design documentation.**

Game/Simulation Project

Instruction relating to the standards in this section should be interspersed throughout the entire course with the other standards taught progressively in the context of game design and development.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
27.0	Create a working game or simulation as part of a team. – The student will be able to:		SC.912.N.1.1
27.01	Create a storyboard describing the essential elements, plot, flow, and functions of the game/simulation.	MAFS.912.G-MG.1.3	
27.02	Create a design specification document to include interface and delivery choices, rules of play, navigation functionality, scoring, media choices, start and end of play, special features, and development team credits.		
27.03	Using a simple game development tool, create a game or simulation.		SC.912.N.3.5
27.04	Present the game or simulation.		SC.912.N.3.5

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
28.0	Create a game design production plan that describes the game play, outcomes, controls, interface and artistic style of a video game. – The student will be able to:		
28.01	Use industry standard game design production documents to create a game design production plan.		SC.912.N.1.1
29.0	Categorize the different gaming genres. – The student will be able to:		
29.01	Research, compare and categorize the different gaming genres.		SC.912.L.15.4
29.02	Analyze examples of different gaming genres.		SC.912.L.15.6
29.03	Define and use the necessary vocabulary related to gaming and the different genres.		
30.0	Identify popular games and identify commonality between them. – The student will be able to:		
30.01	Analyze and deconstruct game environments and interactions.		SC.912.N.1.1
30.02	Compare and contrast the top selling video games in terms of player interaction, plot complexity, and reward.		
30.03	Categorize gameplay elements by player type (killer, talker, explorer and achiever).		
31.0	Understand the general procedure and requirements of game design. – The student will be able to:		
31.01	Describe the design process from conception to production.		
31.02	Explain the iterative nature of game design through the different stages of design iterations including pre-alpha, alpha, beta, release candidate, going gold and support.		
31.03	Develop design plans, for example, character sketches, documentation and storyboards for proposed games.		
32.0	Understand the general principles of storytelling for game design. – The student will be able to:		SC.912.N.1.7
32.01	Identify the essential elements of a story.		SC.912.N.1.1
32.02	Describe how creative writing is used as a game design tool.		
32.03	Compare and contrast methods of delivering a story in a game.		
33.0	Understand character archetypes and character design. – The student will be able to:		
33.01	Research and identify common character archetypes used in computer games.		
33.02	Design character prototypes to physically match archetype.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	33.03 Create character backstory and profile.		
34.0	Develop a game design document. – The student will be able to:		
	34.01 Create a game strategy overview, character overview, and storyboard overview.		
	34.02 Define the rules of play and multi-player options.		
	34.03 Define strategic positioning of game immersion dynamics and psychological effect.	MAFS.912.G-MG.1.3	
	34.04 Describe how game layout charts are used in game design.		
	34.05 Understand the use of storyboards in the game design industry with regard to environmental illustrations, level designs, character designs, model sheets and GUI designs.		SC.912.N.1.1
35.0	Understand the process of creating and designing player choice and other game designer strategy considerations. – The student will be able to:		SC.912.L.17.15
	35.01 Describe the use of artificial intelligence challenges in game design and the need for giving the player rest time between challenges.		
	35.02 Evaluate the impact of randomness in game design especially as it pertains to pattern recognition.	MAFS.912.S-MD.1.1 MAFS.912.S-MD.1.2	
	35.03 Identify techniques used in the industry to help the player to navigate.		
	35.04 Discuss the principles of player-centric design.		
	35.05 Examine and discuss design elements that encourage continuous active engagement both mental and physical.		
	35.06 Analyze design elements that maintain player interest and vary the degree of challenge.		SC.912.N.1.1
	35.07 Discuss the need for a balance of design elements for the purpose of rewarding and frustrating players.		
36.0	Create and design the game flow as it relates to story and plot. – The student will be able to:		
	36.01 Identify techniques of introducing the story plot and beginning play.		
	36.02 Describe story plot development techniques for the middle of play in game design.		
	36.03 Analyze and discuss planning techniques for climax and finale of games.		
37.0	Assess common principles and procedures in game flow design. – The student will be able to:		
	37.01 Assess missions and scenarios game flow techniques.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	37.02 Describe common use of mission design and campaigns.		
	37.03 Evaluate usage of static versus dynamic campaigns.		
38.0	Describe player challenge rule creation elements. – The student will be able to:		
	38.01 Research common design methods for clearing obstacles or series of obstacles.		SC.912.N.1.1
	38.02 Describe common design elements introducing skill, luck and combinations including escalating challenges to games.		
	38.03 Identify common design elements used to vary weapons, characters and tools.		
	38.04 Discuss the incorporation of risk reward and adaptive challenges (AI).		
39.0	Understand the use of inventory systems in game design. – The student will be able to:		
	39.01 Discuss the various methods of describing items in player's inventory in contemporary game design.		
	39.02 Review and discuss industry methods of communicating how inventory items can have an effect on game play.		

Florida Department of Education
Student Performance Standards

Course Title: **Game & Simulation Graphic Artist**
Course Number: **8208130**
Course Credit: **1**

Course Description:

This course is focused on students acquiring skills to create, refine, and integrate realistic 2D graphics into a game or simulation product. Students will essentially learn how to use a graphic software package, file maintenance strategies, and migration techniques and issues.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
40.0	Understand the various job titles and responsibilities of a graphic artist as it relates to the game industry. – The student will be able to:		
40.01	Identify the job titles of graphic artist used in a game project.		
40.02	Demonstrate the ability to work as part of an art team.		
40.03	Perform one or more of the following roles for a game project: concept artist, art director, texture artist, environment artist.		
41.0	Develop the art direction for a game. – The student will be able to:		
41.01	Develop a vision for visual elements of a game.		SC.912.N.1.1
41.02	Create conceptual game art using various techniques, emphasizing space and form through range of value, placement, reflections, and shadows.		
41.03	Create character sketches, architectural sketches and background sketches.		
41.04	Understand the challenges of art direction as it relates to mobile devices.		
42.0	Determine and document the graphical needs of a game using design documents including art direction and reference materials. – The student will be able to:		
42.01	Develop characters and game elements in respect to the art direction laid out in the design documents.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
42.02	Determine the appropriate file format between vector based (resolution independent) vs. rasterized graphics (resolution dependent).		
42.03	Understand the different aspects of quality and detail in relation to performance and size.		
42.04	Understand the role of naming conventions as it applies to creative assets storage used in the work flow.		
42.05	Demonstrate the effective use of alternative resolutions, scaling and file formats.		
43.0	Understand the fundamentals of drawing and painting techniques. – The student will be able to:		
43.01	Demonstrate the use of different techniques, format, media or style.		
43.02	Understand the use of primitives.		
43.03	Demonstrate basic understanding of composition of a scene.		
43.04	Understand the shape of the human form.		
43.05	Know the value of lights and shadows.		
44.0	Demonstrate a working knowledge of vector and paint programs used to make graphics. – The student will be able to:		
44.01	Know the difference between Vectors and Bitmaps.	MAFS.912.N-VM.1.1	
44.02	Demonstrate understanding of various graphic art programs.		
44.03	Utilize the programs tools and brushes.		SC.912.N.1.1
44.04	Know the importance of Layers.		
44.05	Identify file formats.		
45.0	Demonstrate the effective use of art input devices. – The student will be able to:		
45.01	Demonstrate the use of a digital tablet within a paint software application.		SC.912.L.17.5
45.02	Demonstrate the process of capturing textures using a digital camera.		
45.03	Demonstrate the process of importing images from a digital camera into a photo editing software application.		SC.912.L.17.5

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
46.0	Demonstrate world building, making graphics and backgrounds for side scrolling, top down, and Isometric projection. – The student will be able to:		
46.01	Know the importance of scale in relation to the player.		
46.02	Understand level design to successfully lead the player.		
46.03	Effectively use graphics to convey mood and story in the game world.		
47.0	Understand the general concepts of environmental design. – The student will be able to:		
47.01	Survey and evaluate commonly used concept art.		
47.02	Create a world sketch with particular attention to maintaining continuity of style.		
47.03	Describe the emotional/psychological aspects of environmental design that signify mood, façade of freedom, and resource struggling.		
48.0	Describe how environmental design is used in conjunction with game level design. – The student will be able to:		
48.01	Examine and evaluate examples of focus on a theme.		
48.02	Describe methods of creating a purposeful architecture giving consideration to continuity and themes and taking advantage of revisiting.		
48.03	Consider and discuss environmental design elements for multi-player or single player games.		
48.04	Describe the history of creating shifts in game design environments and embracing novel ideas.		
48.05	Identify and discuss environmental design pitfalls such as red herrings and cookie-cutter layouts.		
49.0	Demonstrate knowledge of basic lighting. – The student will be able to:		
49.01	Demonstrate an understanding of 3 point lighting (key, fill, back).		
49.02	Demonstrate an understanding of low-key and high-key lighting.		
50.0	Demonstrate knowledge of basic materials and textures. – The student will be able to:		
50.01	Demonstrate an understanding of material and texture storage.		
50.02	Apply textures to an object.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	50.03 Demonstrate an understanding of procedural shaders.		
	50.04 Demonstrate an understanding of channels.		
	50.05 Adjust the transparency, luminance, and reflection of a material.		
	50.06 Demonstrate an understanding of displacement maps.		
	50.07 Demonstrate an understanding of bump maps.		
	50.08 Demonstrate an understanding of UV mapping.		
	50.09 Demonstrate an understanding of 3D painting.		
51.0	Demonstrate basic understanding of modeling principles. – The student will be able to:		
	51.01 Demonstrate an understanding of primitives and parametric modeling.		
	51.02 Demonstrate an understanding of non-uniform rational basis spline (NURBS), splines, and polygonal modeling.		
	51.03 Demonstrate the ability to use reference images and files while modeling.		
52.0	Demonstrate knowledge of polygon modeling. – The student will be able to:		
	52.01 Demonstrate an understanding of N-gons.		
	52.02 Demonstrate an understanding of subdivision.		
	52.03 Demonstrate basic polygon editing and manipulation.		
	52.04 Demonstrate an understanding of cutting/division tools.		
	52.05 Demonstrate an understanding of extrudes.		
	52.06 Demonstrate an understanding of symmetry.		
	52.07 Demonstrate an understanding of basic deformers (bend, twist, melt).		
53.0	Demonstrate knowledge of non-uniform rational b-splines (NURBS) modeling. – The student will be able to:		
	53.01 Demonstrate an understanding of points, vertices, edges, and polygons.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
53.02 Demonstrate an understanding of poly-count.		
53.03 Demonstrate an understanding of primitives.		
53.04 Locate an object's properties, attributes, and coordinates.		
53.05 Demonstrate understanding of Non uniform rational b-splines (NURBS).		
53.06 Demonstrate understanding of splines and generators (extrude, lathe, sweep).		
53.07 Understand the use of hierarchy.		
53.08 Demonstrate an understanding of Boolean objects.		
53.09 Demonstrate an understanding of Null objects.		
54.0 Demonstrate advanced texturing techniques. – The student will be able to:		
54.01 Create texture maps for objects in games.		
54.02 Develop 3D texture mapped objects.		

Florida Department of Education
Student Performance Standards

Course Title: **Game & Simulation 3D Graphic Animator**
Course Number: **8208140**
Course Credit: **1**

Course Description:

This course is focused on students acquiring skills to create, refine, and integrate realistic 3D graphics into a game or simulation product. Students will essentially learn how to use a 3D animation software package, file maintenance conventions, and migration techniques and issues.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
55.0	Understand the various job titles and responsibilities of a 3D animator as it relates to the game industry. – The student will be able to:		
55.01	Identify the job titles of a 3D animator used in a game project.		
55.02	Demonstrate the ability to work as part of an animation team.		
55.03	Perform one or more of the following roles for a game project: animator, rigger, vfx artist.		
56.0	Understand the principles of 2D and 3D animation as it relates to game graphics (walk, run, Jump, idle). – The student will be able to:		
56.01	Demonstrate the ability to create character and object views from which to animate.		
56.02	Break down animation into a series of pictures to import into a game engine.		
56.03	Demonstrate an understanding of the value of timing to convey character motion.		
56.04	Demonstrate the effective use of animation arcs for the articulation of body elements.		
56.05	Demonstrate the use of principles of animation such as anticipation, squash, stretch, weight, exaggeration and overlapping & secondary motion.		SC.912.P.12.4
56.06	Understand the use of motion capture techniques and acting principles.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
57.0	Demonstrate a working knowledge of modeling and paint programs used to make 3D graphics and animation. – The student will be able to:		
57.01	Understand the limitation of bitmaps images.		
57.02	Understand the use and application of bump map, normal and displacement images applied to a model.		
57.03	Demonstrate understanding of various digital content creation tools.		
57.04	Utilize the programs tools and brushes.		
57.05	Know the importance of layers.		
57.06	Identify file formats.		
57.07	Create simple shapes and structures that can be exported to games or game editors.		
58.0	Demonstrate knowledge of basic animation. – The student will be able to:		
58.01	Apply animation principles to object animation.		
58.02	Demonstrate an understanding of animation timelines.		
58.03	Demonstrate an understanding of key framing.		
58.04	Demonstrate an understanding in the use of controllers.		
59.0	Demonstrate knowledge of rigging. – The student will be able to:		
59.01	Define rigging as a process.		
59.02	Compare and contrast rigging approaches and styles.		
59.03	Demonstrate an understanding of the rig as it relates to the model.		
59.04	Demonstrate an understanding of skeletal systems.		
60.0	Understand the fundamentals of facial animation. – The student will be able to:		
60.01	Understand facial land marking.		
60.02	Demonstrate the ability to show emotions through the eyes.		
60.03	Demonstrate the use of motion capture data as it applies to facial animation.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
61.0	Create a user interface. – The student will be able to:		
61.01	Understand good menu flow of the user interface.		
61.02	Design the ideal HUD (Heads Up Display).		
62.0	Create visual effects. – The student will be able to:		
62.01	Understand particle design for fire and smoke.		
62.02	Create water spray using 2D particles.		
62.03	Know the anatomy of an explosion effect.		
62.04	Create a 3D feel in a 2D world using light and shadows.		
63.0	Create particle system effects. – The student will be able to:		
63.01	Understand particle design for fire and smoke.		
63.02	Create water spray using 3D particles.		
63.03	Know the aspects of an explosion effect.		
64.0	Individually design and create a playable game. – The student will be able to:		
64.01	Use a number of computer tools to enhance and ease game programming and artistry.		SC.912.N.1.1
64.02	Use a game engine to create a playable game.		SC.912.N.1.1
64.03	Use animated objects.		SC.912.N.3.5
64.04	Integrate sound and music to enhance the game experience.		SC.912.N.1.1
64.05	Test and debug to game completion.		

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student. Access MyCareerShines by visiting: www.mycareershines.org.

Career and Technical Student Organization (CTSO)

Future Business Leaders of America (FBLA) and Business Professionals of America (BPA) are the intercurricular career and technical student organizations providing leadership training and reinforcing specific career and technical skills for secondary students. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

Additional Resources

For additional information regarding articulation agreements, Bright Futures Scholarships, Fine Arts/Practical Arts Credit and Equivalent Mathematics and Equally Rigorous Science Courses please refer to:
http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml